Journal
OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION

General Articles

Radiology in the Diagnosis of Canine Thoracic Ailments—*Wayne H. Riser* 445

Surgery and Obstetrics

Traumatic Chylothorax in Small Animals Treated by Ligation of the Thoracic Duct—*Donald F. Patterson and Todd O. Munson* 452
Observations on Effect of Preanesthetic Medication with Meperidine and Promazine on Barbiturate Anesthesia in an Ocelot and a Leopard —*Donald H. Clifford* 459

Clinical Data

Sensitivity of Swine and Cattle to Artificial Infection with Western Equine Encephalitis Virus—*Winn—Kaplan—Palmer—Solomon* 464
Recovery of a Heifer with Tetanus—*C. J. Bryer, Jr.* 466
A Study of Penicillin Tolerance of Some Organs Infecting the Bovine Mammary Gland—*B. T. Throop and E. W. Swanson* 467
The Use of the Modified Whiteside Test as a Screen Test for Bovine Mastitis —*Easterday—Simon—Hanson* 470
A Method for Graphic Measurement of the Physical Forces and Differential Pressures in Mechanical Milking Systems—*D. O. Noorlander and O. W. Schalm* 474
Allergic Dermititis in a Dog—A Case Report—*Jerome H. Ripps* 479
Cleft Lip and Palate in the Dog—*L. R. Setty* 480
What Is Your Diagonsis? . . . . . adv. p. 39

Editorial

The Veterinarian and the Guide Dog 481

The News . . . . . 483 **Organization Section . . . . . adv. p. 26**

Correspondence, adv. p. 4; Coming Meetings, adv. p. 32
AVMA Report . . . . . adv. p. 12

The Roster . . . . . adv. p. 26

Contents continued on adv. pages 2 and 4

Vol. 133 **November 1, 1958** **No. 9**

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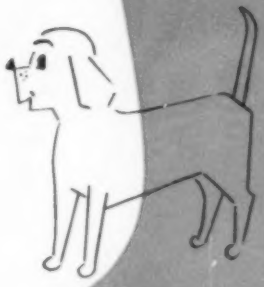

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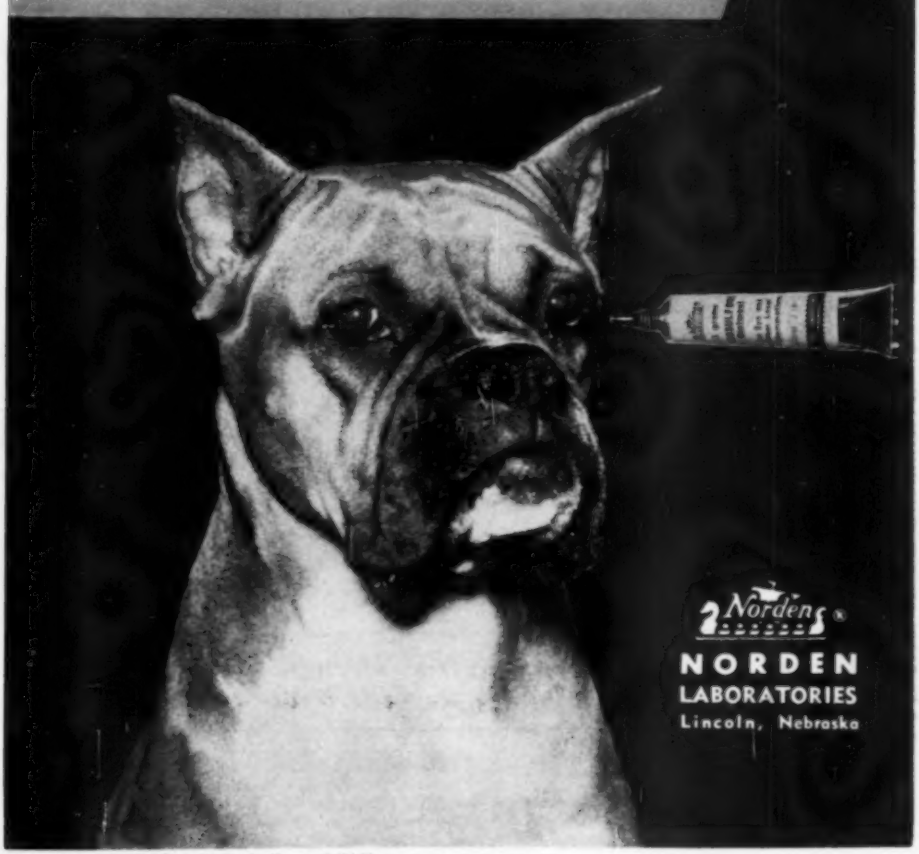

Dog shown is: Kadoma's Lady Beau A.K.C.

Journal of the American Veterinary Medical Association

CONTENTS

Continued from Cover

SURGERY AND OBSTETRICS

Body Temperatures in Cows During the Estrous Cycle .. 458
Pregnancy Toxemia and Steroid Therapy 458
Breeding Ability of Male Mink After Isolation 463

CLINICAL DATA

Mycotic Mastitis 473
Streptococcic Bovine Mastitis in Italy 473
Effect of Vacuum and Pulsation Rate on the Rate of Machine Milking 479

CURRENT LITERATURE

Abstracts

Genital Vibrio Infection in Sheep 482

Foreign Abstracts

The County and Municipal Veterinary Hospitals of the U.S.S.R. 482

Books and Reports

Liver-Fluke Snails in Britain 482
Congress of the German Veterinary Medical Association 482

THE NEWS

Soviet Agricultural Exchange Delegation on Veterinary Science Visits the AVMA Offices 483
U.S.D.A. Plans Extensive Recruitment Program in Meat and Poultry Inspection Activities 484
Among the States and Provinces 485
U.S. Government 487
State Board Examinations 487
Deaths 487

EDITORIAL STAFF: W. A. Aitken, Editor in Chief; Donald A. Price, *Associate Editor;* H. E. Kingman, Jr., *Managing Editor;* Eva G. Bailey, *Assistant to the Editors;* Dinah Polen, *Production Manager.*

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Correspondence

August 13, 1958

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If the members of the American Veterinary Medical Association knew of our need, they might assist us in securing more dogs with this deformity. At the present time, we have a female Cocker Spaniel and a male Pug and would like to secure other affected dogs of small breeds.

Anyone wishing to contribute a small dog with this deformity should contact Dr. Mirsky.

Thank you for any help you can give us.

Sincerely yours,
ROBERT K. COOPER, D. D. S.
Lancaster, Pa.

• • •

August 28, 1958

Dear Sir:

In an endeavor to stimulate submission of higher quality manuscripts to our JOURNAL and to improve the quality of clinical research among my colleagues, I feel compelled to comment on the article "Polyvinylpyrrolidone (HPX)—A New Treatment for Bovine Mastitis" which appeared in the JOURNAL (Aug. 1, 1958: 169-171).

I submit that the only conclusions that can be drawn from the article, which is little better than a testimonial, are:

1) Polyvinylpyrrolidone is apparently innocuous when instilled into infected bovine mammary gland quarters in 1-Gm. quantities.

2) The low rate of apparent cure in group 1 provided by penicillin and dihydrostreptomycin alone indicates either a high incidence of chronic mastitis, or poor management and sanitation, or both.

These are the only conclusions I can draw, for the following reasons:

1) Cows in two herds were treated with antibiotics only and the cows in two other herds were treated with antibiotics plus polyvinylpyrrolidone; this essentially divides what was intended to be one experiment comparing results obtained with two different formulations into two experiments evaluating the two formulations separately under different conditions and without apparent controls.

2) No nonmedicated or placebo controls were maintained to aid in determining the superiority, if any, of either treatment over no treatment.

3) No mention was made of the total number of cows in the two herds represented in each experimental group; such data would have provided some information as to the epizootiological character of the disease in the two groups.

4) No information was provided concerning the methods of post-treatment cultures and the number of cultures made. The failure to isolate and identify the ascribed causative agent of mastitis on a single post-treatment culture is of little or no significance in evaluating the results of treatment. A more critical evaluation would consist of at least two post-treatment cultures, the last made no less than one month following treatment.

5) The cows in the four herds should have been randomly allotted to three approximately equal groups and the two compounds tested against a placebo.

Respectfully yours,
s/GEORGE E. SHORT, D.V.M.
Norwich, N. Y.

CONTENTS—Continued

MISCELLANEOUS

A Survey of Leukosis in Animals 451
Bats and Histoplasmosis 451
Thyroprotein and Milk Production 451
A Viral Respiratory Disease of Quail 451

ORGANIZATION SECTION

Official Roster—1958-1959 ..... adv. p. 26
National Board of Veterinary Examiners ..... adv. p. 31
Applications ..... adv. p. 31

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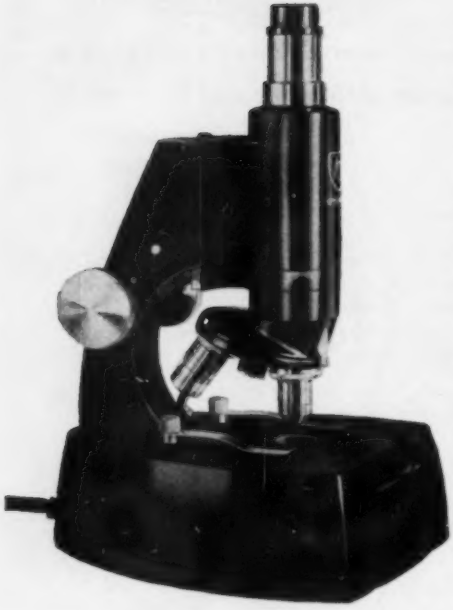

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AVMA Report

Veterinary Corps Status

A number of letters received following the announcement of Defense Secretary McElroy's decision relative to the Veterinary Corps, have been highly complimentary with regard to the part the Association played in obtaining this favorable action.

The following letter is reproduced in this column as an expression of appreciation to AVMA members and others who, in so many ways, contributed to the success of this undertaking.

Washington 25, D. C.
September 12, 1958

Dear Dr. Kingman:

I want to express, for the Corps and myself, sincere appreciation for the interest and continuing efforts expended on behalf of the Veterinary Corps of the Army.

It is very difficult for me to adequately express thanks, not only to your staff, but to the many constituent associations, other professional organizations, individuals, etc. The work which they did on behalf of the Corps is responsible for its existence today. If the Corps had been abolished, it would have been a distinct loss to the entire profession in prestige and recognition of the advancement of veterinary medicine. In addition, it is an almost certainty that the armed services would have acutely felt the loss in a very short time.

I feel free in writing this letter, as all the work done on behalf of the retention of the veterinary services was aboveboard. The request made by organized veterinary medicine to the Congress, Department of Defense, etc., was not to save the Corps because it would eliminate jobs for veterinarians, but that veterinarians in the armed services are essential for a complete health service, and before elimination or transfer of functions an all-out investigation should be made. In effect, all the AVMA asked was that a fair hearing be given before any definite steps toward abolishment was made. The hearing recommended was given within the Department of Defense and, as you well know, resulted in retention of the veterinary services.

Though I feel that in the past we have done a good job, I hope that in the future we will do even better. We hope, by exemplary professional conduct and achievement, to make our profession proud of the Army veterinary service.

If you find it feasible, I would appreciate it if you could, through the medium of the JOURNAL, express our thanks to individuals, constituent associations, and other organized groups for their support, given so unstintingly on behalf of the veterinary services in the armed forces. The support was voluntary, as for obvious reasons we in the services could not solicit such help.

Sincerely,
s/ELMER W. YOUNG
Brigadier General, V.C.
Chief, Veterinary Division

Mrs. Bayless Retires

Mrs. Helen Bayless, assistant editor and advertising manager of AVMA publications, retired on Sept. 30, 1958, after more than 17 years with the Association. She joined the staff in May, 1941, became assistant to the late Dr. Merillat, then editor-in-chief, in 1942, advanced to assistant editor in 1944, and was soon assigned the additional duties of advertising manager.

Mrs. Bayless' work included not only editorial work on the AVMA and Research JOURNALS but also the production of these and other Association publications, as well as contacts with printers, advertisers, and advertising agencies.

From the varied activities and her work with other staff members, AVMA officers, and Committees, Mrs. Bayless gained wide knowledge of many aspects of veterinary medicine and an understanding insight into the work of the profession and its problems; her objective viewpoints and advice on such matters were of great value.

Members of the central office staff joined in a farewell luncheon to Mrs. Bayless on October 2, at which appreciation was expressed for her years of dedicated service to the Association and presentation was made of a portable typewriter.

The best wishes of her many friends throughout the Association and the profession are extended to Mrs. Bayless for enjoyment of her well-earned retirement.

Are we skating on thin ice?

Back when we were kids, we used to get a kick out of seeing how close we could skate to the edge of a deep hole without getting wet. Skating on thin ice was fun. And if we got too close, all we got was an ice-cold dunking—somebody was always around to pull us out.

Today's practicing veterinarian may be doing the same thing when he buys from a supplier who also sells direct to laymen. He, too, may be skating on thin ice. The danger is if too many skaters do this, they may weaken the ice that supports the whole livestock industry.

The question then is one of degree. How many are "too many"? Where is the breaking point, where do we all fall in? Can we stop short of the water, if enough of us continue to skate on thin ice? We hope so . . .

For there may not be anyone around to pull us out!

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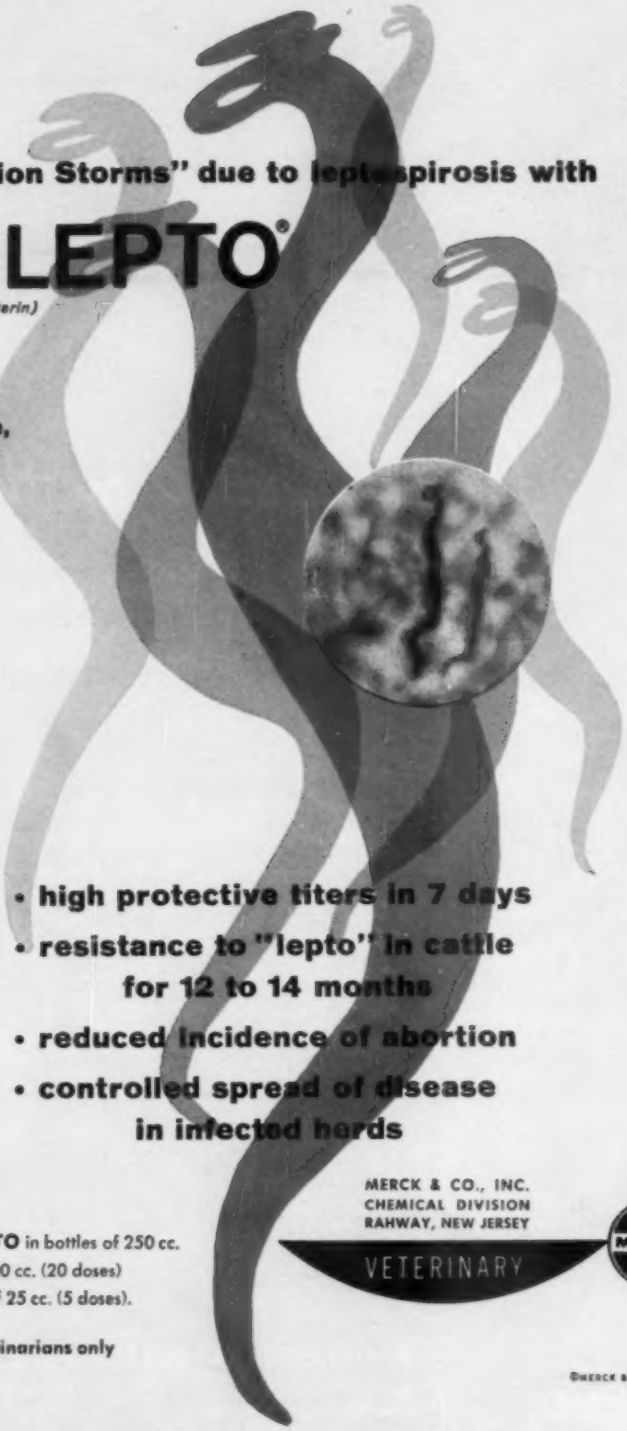

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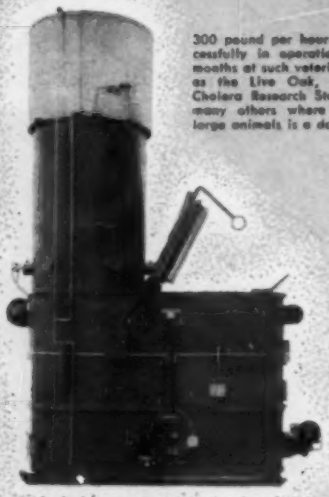

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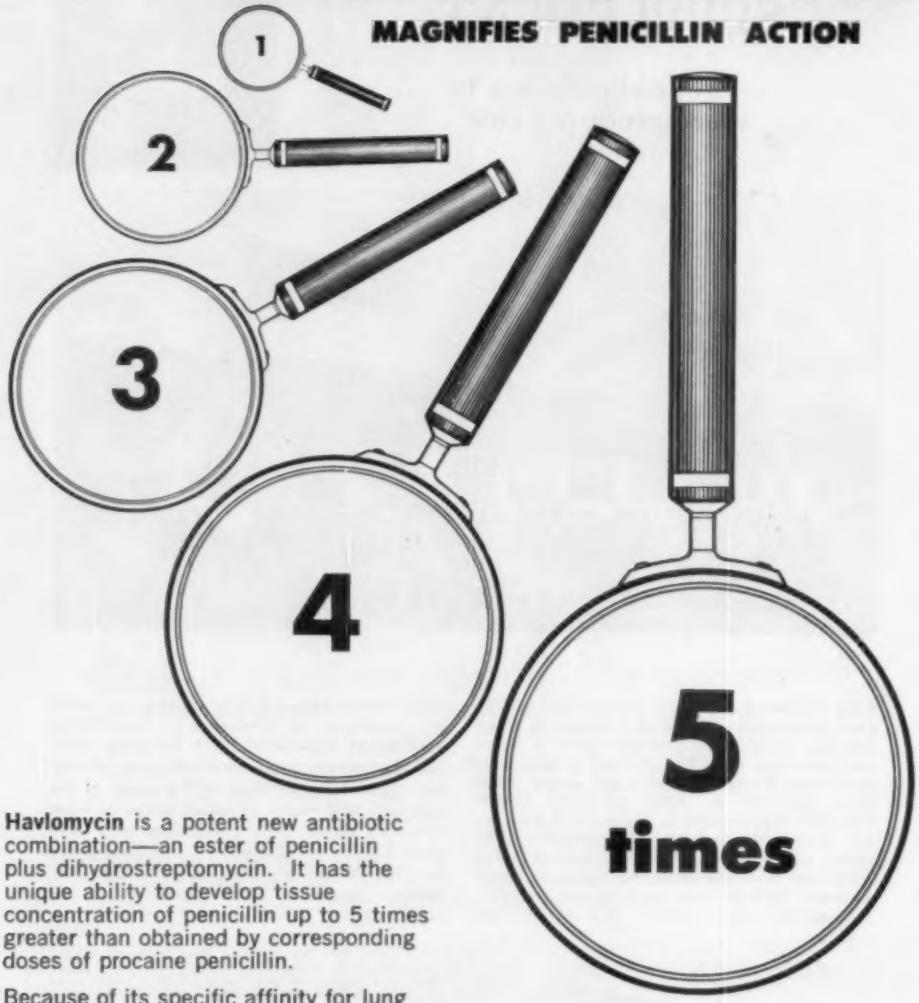

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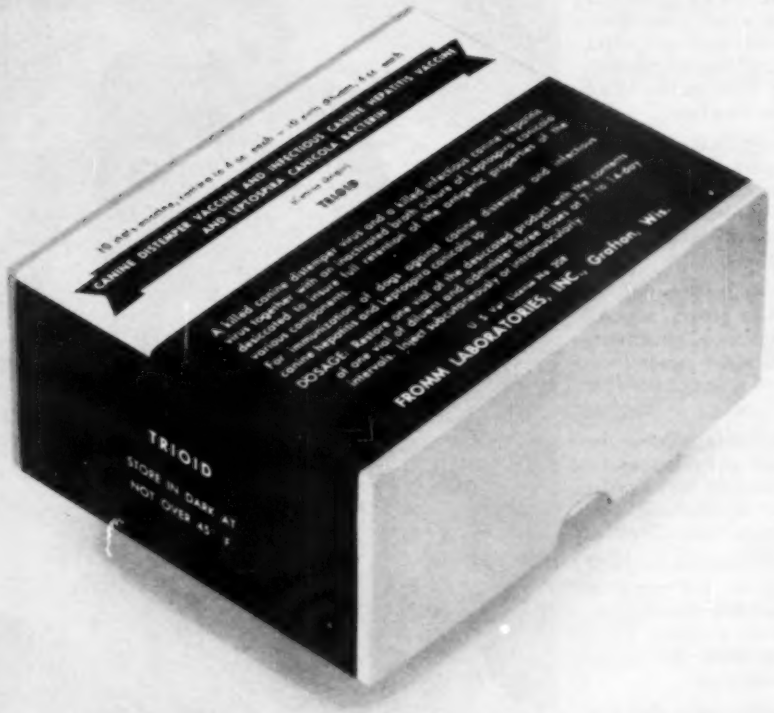
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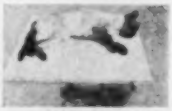

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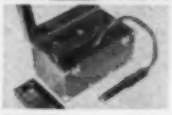

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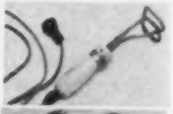

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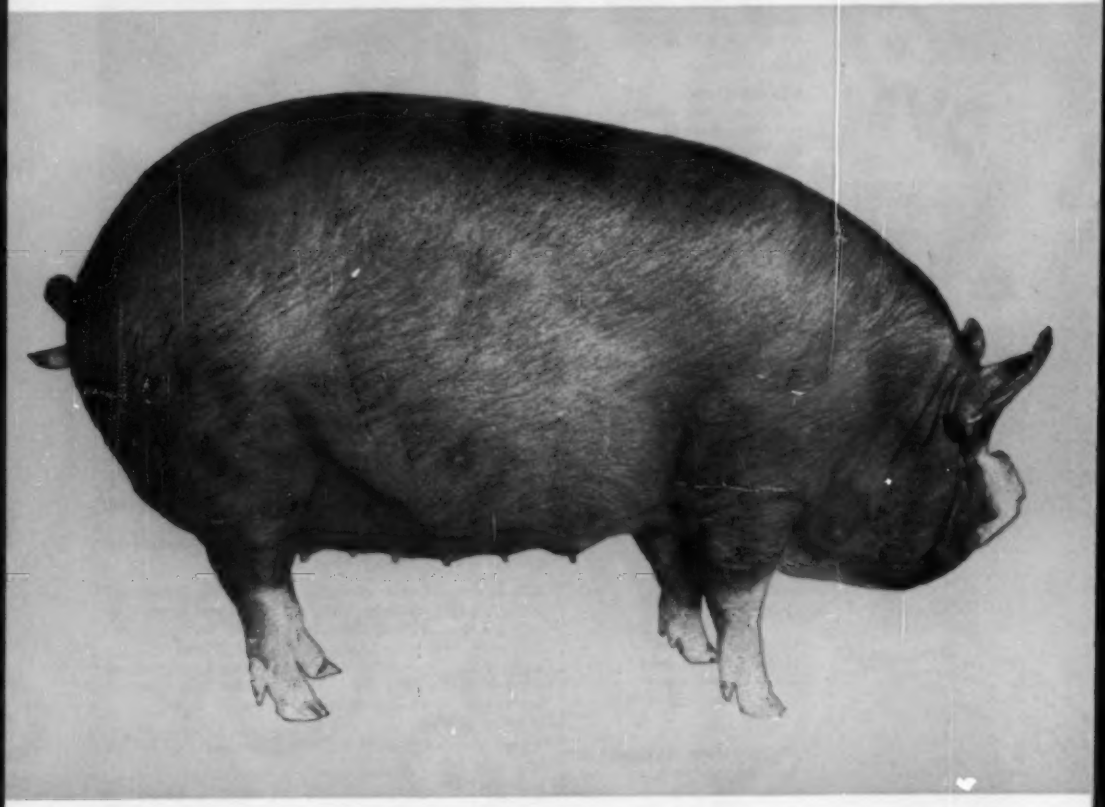

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Radiology in the Diagnosis of Canine Thoracic Ailments

WAYNE H. RISER, D.V.M., M.S.

Skokie, Illinois

APPLIED RADIOLOGY is useful in the diagnosis of diseases of the thorax. Regardless of the importance of becoming proficient in the art of auscultation and percussion, it is difficult to diagnose and interpret the changes that may be present in the thoracic cavity. Therefore, the correlation of clinical signs with radiological findings presents a valuable diagnostic aid.

As the veterinary practitioner gains experience in technique, skill, and interpretation, clinical x-ray diagnosis will become an essential part of small animal practice, especially when changes in the thoracic cavity are suspected. However, a diagnostician can not be expected to become competent in interpretation of radiographs of the thorax without correlating the radiological findings with the lesions found at necropsy. Before such correlation can be begun, the films must be of diagnostic quality.

To get "diagnostic films," the equipment must be good enough to overcome the effects of movement and of density of tissue, and the animal must be restrained by anesthesia, sedation, or tranquilization. Then, even though a good radiograph is obtained, it will be difficult for veterinarians without special training to correctly interpret the shadows on the film.

If the interpretation is to be correct, there must be a close collaboration between the clinician who obtained the history, those who have followed the course of the disease, those skilled in radiology, and the pathologist who has studied similar lesions grossly and microscopically.

Four cases, which illustrate what can be accomplished from such collaboration, were studied by a group of colleagues who met weekly, for over four years, with a radiologist in human medicine. They found that to make satisfactory films of the thorax it was necessary to get equipment sufficiently powerful to penetrate the depth of the thoracic cavity with an output of 100 ma., in a time limit of 0.1 to 0.2 seconds.

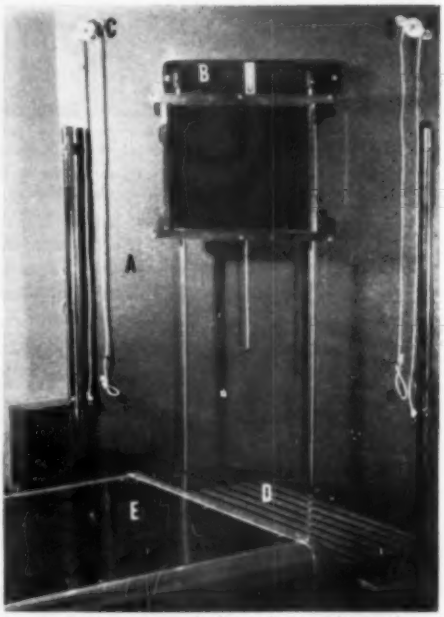
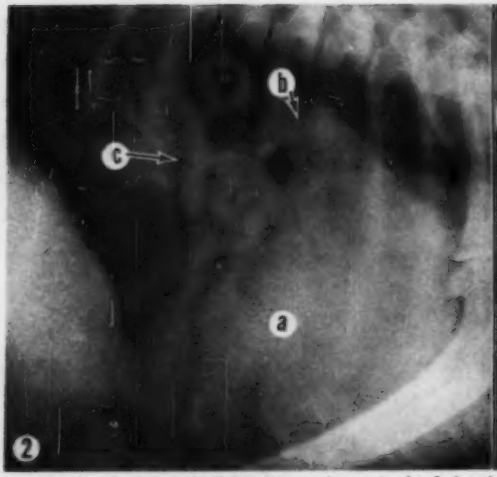


Fig. 1—Equipment used for taking radiographs of animals in erect and standing positions—parts include movable lead screen (A) to which the film holder (B) is attached; the animal is held erect by adjustable ties (C) and the body is supported by a shelf (D) attached to the end of the x-ray table (E).

Once this equipment was procured, it was soon realized that films taken from a lateral view were of limited significance,

Dr. Riser is a small animal practitioner in Skokie, Ill.



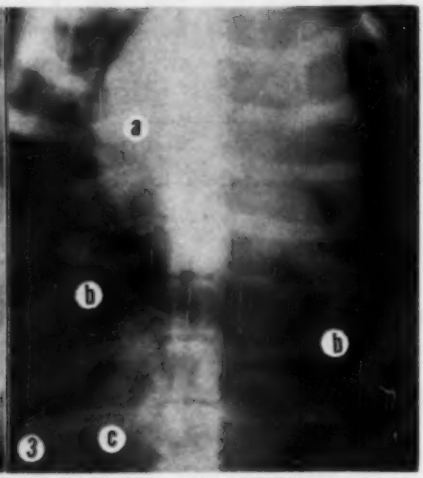


Fig. 2—Radiograph (lateral recumbent view) of the thorax of a dog (case 1). Notice the enlarged heart shadow (a), a thrombus in the pulmonary artery (b), and an area of congestion (c).

Fig. 3—Radiograph (erect ventrodorsal view) showing the heart (a) of a dog (case 1) in relation to two comma-shaped densities (b), which proved to be emboli, and an area of congestion (c).

giving only information as to the size of the heart and the positions of the trachea, esophagus, and aorta. This is because the lateral view superimposes one lung upon the other, masking the areas of density. It was soon demonstrated that using ventrodorsal or dorsoventral views, with the animal extended in an erect position, added greatly to the value of the film.

Fig. 4—Photograph of the dilated trachea (a) and lungs of a dog (case 1). The pulmonary arteries have been opened to show the emboli (b) in situ.

The film holder and other equipment used for restraining the animal in an erect position are shown (fig. 1). Pictures should be taken with the x-ray beam at least 40 inches from the film, but definition may be increased by using distances up to 72 inches. These greater distances seem to accelerate sharp definition and good contrast. Use of a cylindrical cone, just large enough to cover the film, will minimize the effects of secondary radiation.

CASE REPORTS

*Case 1.**—A 5-year-old, nonspayed, female Pointer, trained for field trial, had been in good health until about a week previously. She had become listless, indifferent toward eating, and had deep and labored respiration. When seen, she was in acute distress, with marked dyspnea, a distended abdomen, and generalized weakness. The temperature was 102 F.

Radiographs were taken with the dog in lateral recumbent and erect ventrodorsal positions. The lateral view showed an enlarged cardiac shadow and a distinct arch-like area of increased density posterior to

*From River Animal Hospital, Skokie, Ill.—Drs. Wayne Riser, Jack Marcus, Edna C. Guibor, and Charles C. Oldt.

the base of the heart (fig. 2). Another radiolucent area at the posterior portion of the base of the heart appeared to be extending into the hilar region of the diaphragmatic lobes of the lungs. The ventrodorsal view showed two comma-shaped dense areas projecting to the left and right of the midline into the lung fields of the diaphragmatic lobes (fig. 3).

Death occurred 24 hours later and, at necropsy, no fluid was found in the thoracic cavity but the trachea was dilated. The arched areas of density were found to be pulmonary arteries distended by the presence of massive-sized emboli (fig. 4). The heart was hypertrophied, particularly on the right side. The myocardium of the right side of the heart, when incised, was greatly thickened and both right chambers contained heartworms (fig. 5).

On the endocardial surface of the auricle, especially in the conical region, there were areas of ulcerative inflammation to which mural thrombi were attached. Several small emboli were present in the right auricle. Four emboli in the pulmonary arteries were up to 6 cm. in length and 2 cm. in diameter. Heartworms were coiled in one of the emboli (fig. 6).

This is an unusual case in many respects. The basic pathological changes were massive occlusive emboli which had formed in the pulmonary arteries, as the result of the endocardiditis due to the presence of heartworms. Endocarditis is not common in the middle-aged dog. Heartworm infestation is common in hunting dogs trained in the South, but is rarely reported as being accompanied by endocarditis. It is recognized that heartworms frequently act as an embolus in the pulmonary arteries, but organ-

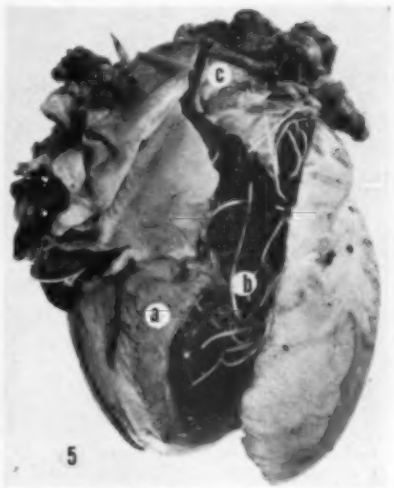


Fig. 5—Hypertrophied heart of a dog (case 1), opened to show the thickened myocardium (a) of the right ventricle, heartworms (b) in the right chambers, and extensive areas of endocarditis (c) in the right auricle.

Fig. 6—Diaphragmatic lobes of the lungs of a dog (case 1), showing dilated pulmonary arteries (a) and emboli removed from them. One embolus (b) contains heartworms.

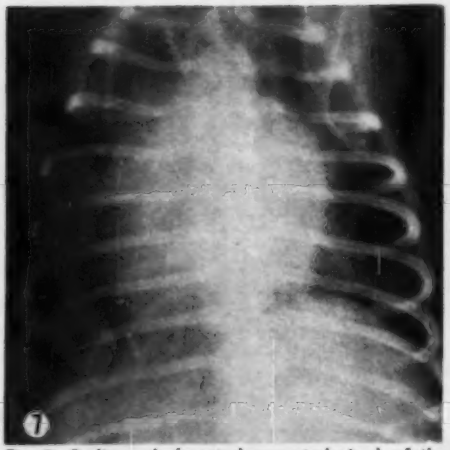


Fig. 7—Radiograph (erect dorsoventral view) of the thorax of a dog (case 2), showing a dilated heart shadow and an absence of pulmonary marking.

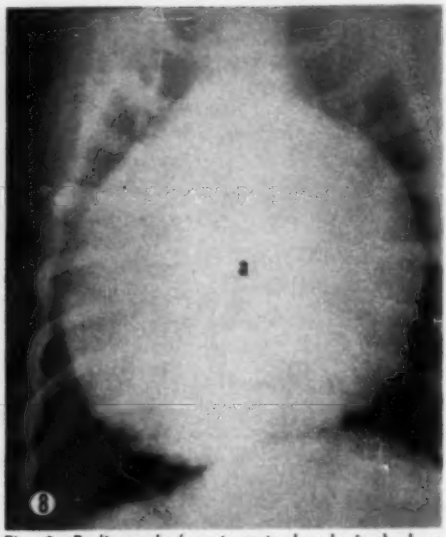


Fig. 8—Radiograph (erect ventrodorsal view) showing the enlarged heart shadow (a) in a dog (case 3).

ized blood clots are rarely associated with them.

In any case, it is surprising to find emboli of this size, even in man where the diameter of the vessels is larger. In man, most emboli of this type are formed in the leg veins, from where they are transported

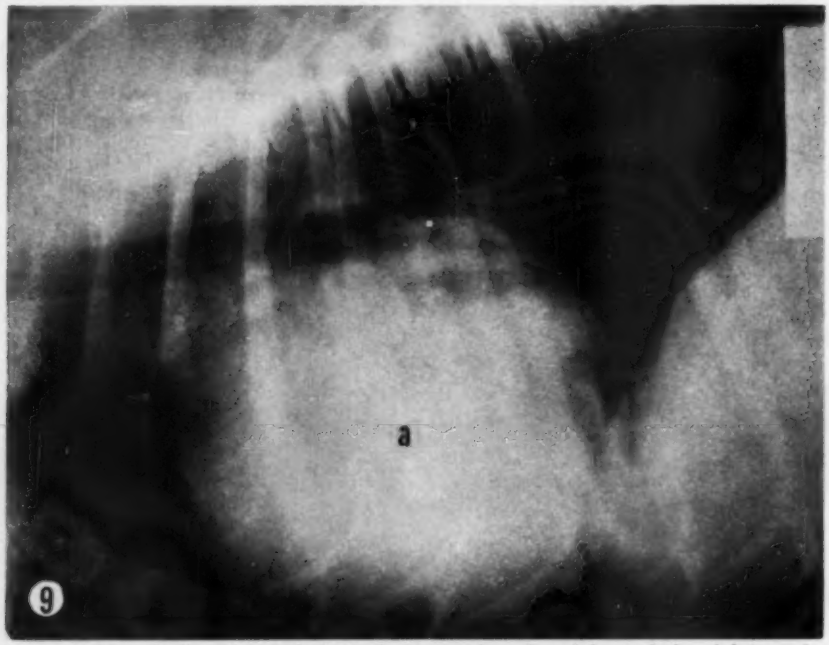


Fig. 9—Radiograph (lateral recumbent view) showing the enlarged heart shadow (a) in a dog (case 3).

Fig. 10—Heart of a dog (case 3) with dilated pericardium (a) reflected up to show aneurysm (b) in appendage of right auricle.

Fig. 11—Left ventricle opened to show inflammatory lesion (a) on a cusp of auriculoventricular valve.

to the right side of the heart. An embolus of the size found here could not have been transported from the leg veins to the heart even in a large dog. Evidently they had formed *in situ* from an accumulation of the thrombus particles that had broken away from the areas of endocarditis, probably a gradual process which allowed for the dilation of the pulmonary vessels not only to accommodate the embolus but to allow blood to pass around the obstruction.

The conclusion that the emboli formed *in situ* is based on four observations:

1) Infarcts were not found in the lungs; the tissue was being nourished and no necrosis of lung tissue was found. If a large embolus had suddenly lodged in a pulmonary artery, signs of the insult would have been immediate and severe. The signs of illness and the changes in the pulmonary vessels were marked but apparently had developed gradually.

2) The lobes of the lungs were congested and not ischemic.

3) There was marked hypertrophy of the myocardium of the right side of the heart, which could scarcely be accounted for by the presence of heartworms alone.

4) Heartworms were found in one of the emboli.

*Case 2.***—A Pomeranian, 7 years old, had periods of difficult, labored breathing for approximately two years, as well as a cough described as deep, whooping, and bronchial. The thorax had become somewhat barrel-shaped as the condition progressed, and the breathing became more labored and coughing more pronounced. The heartbeat was regular and at a normal rate but, when the hand was placed around the sternum, a vibration or "thrill" could be felt with each beat. Also, blowing sounds could be heard with a stethoscope.

A radiograph taken with the dog in an erect ventrodorsal position showed the heart to be enlarged (fig. 7). Markings of the bronchi and the vessels were not distinguishable although, in some areas around the heart, a shadow of increased density could be seen. After the dog died, the heart was found to be dilated, particularly on the right side, where the cusps could not make contact. This no doubt was responsible for the blowing sounds and the thrill. The lungs were heavy, congested, and filled with a frothy fluid. This case is an example of passive congestion and pulmonary edema due to a failing heart.

**From Niles Animal Hospital, Niles, Ill.—Drs. T. J. Lafeber, Jean Beckwith, and D. R. Strombeck.

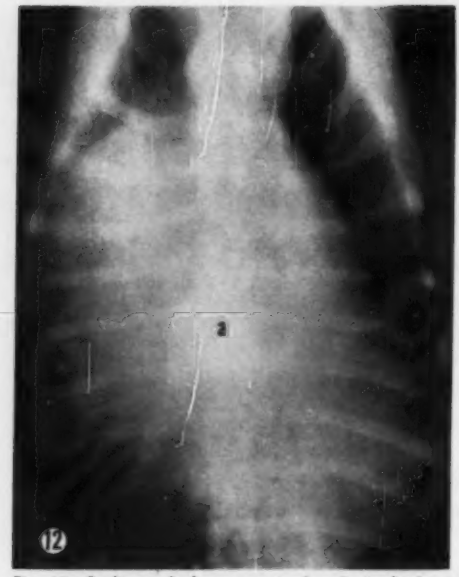


Fig. 12—Radiograph (erect ventrodorsal view) showing a well-demarcated enlargement (a) in the thoracic cavity of a dog (case 4).

Case 3.†—A female, nonspayed Doberman Pinscher, 11 years old, had always been in normal health, but for three days she had been increasingly less lively and responsive. She was mildly dyspneic, the head and neck were slightly extended, and the forelegs were turned out at the elbows. She appeared bright, obeyed commands, and otherwise showed no distress. Her temperature was normal. Radiographs, an erect ventrodorsal view (fig. 8) and a lateral recumbent view (fig. 9), showed the heart shadow to be greatly increased.

At necropsy, after euthanasia, the pericardial sac was found to be distended with an estimated 500 or 600 cc. of blood. The hemopericardium resulted from a ruptured aneurysm on the lateral wall of the right auricle (fig. 10). The opening had undoubtedly been sufficiently small that the pericardial sac filled gradually, allowing for the pressure on the heart and for the decrease in blood volume. An additional lesion was found on a cusp of the left auriculoventricular valve (fig. 11). This valvulitis, or endocarditis, was thought to be incidental to the aneurysm.

Case 4.‡—A male Springer Spaniel, 7 years old, became acutely ill and when first examined had a temperature of 107 F. The dog was depressed, anoretic, and dyspneic. The leukocyte count was 37,000 per cubic millimeter and a radiograph (lateral view) of the thorax showed increased density across the bottom half of the lung field, up to the level of the aorta and base of the heart. The density was increased enough to obliterate the heart shadow. An erect ventrodorsal view of the thorax showed the increased density to be demarcated and not to extend over the entire lung field. No fluid level was distinguishable.

The dog was treated extensively with antibiotics and, after three days, the temperature returned to normal and the general condition was considerably improved.

A week later, a radiograph, erect ventrodorsal view (fig. 12), showed a well-demarcated enlargement, thought to be distinguishable from the heart, in the thoracic cavity. This prompted the diagnosis of a tumor not connected to the heart or the pericardium. An exploratory thoracotomy was done from the right side, by removal of the right fifth and sixth ribs, because it seemed that the enlargement was most extensive on that side. An extensive cystic mass was found in the mediastinum attached to the base of the heart and extend-

†From Glencoe Animal Hospital, Glencoe, Ill.—Drs. Myron Bernstein and Donald R. Karr.

Fig. 13—Photograph of the incised tumor from a dog (case 4). Notice the cavity (arrows) in the center of the mass.

‡From Niles Animal Hospital, Niles, Ill.—Drs. T. J. Lafeber, Jean Beckwith, and D. R. Strombeck.

ing posteriorly toward the diaphragm. In excising the tumor, a difficult procedure which took about three hours, the cystic mass was ruptured and an estimated 400 to 500 cc. of straw-colored fluid escaped. The animal soon died.

The mass (fig. 13) had a thick wall with a cavity in the center. Histologically, this was thought to be a cystic thymoma of teratomatous origin.

Survey of Leukosis in Animals

Leukosis is becoming more prevalent, especially in cattle, chickens, and man. Annual losses from bovine leukosis, in Sweden, are estimated at $1 million, and from avian leukosis, in America, at $75 million. Leukosis in animals is not identical to that in man but seems to be closely related.

Until the present century, leukosis was considered a rare disease. It was reported in cattle in Denmark in 1916, and in cattle in eastern Germany in 1934, and was the main topic of the XIIIth International Veterinary Congress in 1938.

All attempts to transmit leukosis from man to animals or from one animal species to another have failed. It can be transmitted intraspecies under certain conditions in chickens and in white mice, especially when their resistance is reduced, as with x-ray exposure. While being species-specific, leukosis can be considered analogous in all mammals. The new formations can consist of erythroblasts, lymphoblasts, myeloblasts, or cells of the reticular tissues; they may be benign or malignant.

The effect of age is difficult to determine since 90 per cent of chickens and swine are slaughtered while young, and probably comparable to men 15 to 25 years old. The disease is not known in lower vetebrates. It occurs more commonly in chickens and in cattle than in man but it is also common in swine and dogs. It is rare in horses and cats. In two surveys, 78 and 90 per cent of the canine disease was in dogs more than 5 years old; it occurs predominantly in cattle 5 to 7 years old. Affected mice are usually 8 to 12 months old.

Where leukosis affects entire herds or flocks, the various forms occur together. In man, lymphadenosis and myelosis were diagnosed in brothers and sisters. With regard to etiology, the respective influence of inner causes, such as heredity, and outer causes, such as the virus, must be considered. The virus may be more common than realized. The incubation period seems to be several months in chickens and mice and several years in cattle.

Research is needed on the histogenesis, preleukemic changes, and artificial transmission of leukosis, and more statistics are needed, especially in cattle and swine.—*J. Dobberstein in Monatsh. f. Vet.-med. (May, 1958): 259.*

Bats and Histoplasmosis

Histoplasma capsulatum was isolated from 45 of 66 soil specimens taken within 5 ft. of the foundation of a house where an epidemic of histoplasmosis had occurred, and in only two of 29 soil specimens taken 6 to 18 ft. from the house. The house sheltered a colony of the brown or house bats and bat feces were found adjacent to the foundation. Chickens had not been kept on the premises for many years. The house bat may be the ecological factor responsible for urban histoplasmosis where the cause has not been determined.—*Pub. Health Rep. (July, 1958): 590.*

Thyroprotein and Milk Production

Thyroprotein feed gives the cow more thyroxine than she requires; therefore, the thyroxine production of her thyroid gland is retarded. When thyroprotein feeding stops, thyroxine production by the thyroid gland increases slowly, resulting in subnormal lactation for about two weeks. However, if the cows are near the end of lactation, milk production may remain below normal and stop earlier than usual.

Experiments with identical twins and extensive field experiments indicate that the milk production in the next lactation period is not affected by this experience.—*West. Dai. J. (Aug., 1958): 33.*

A Viral Respiratory Disease of Quail.—A virus was isolated, at Texas A. & M. College, from a bobwhite quail affected with a highly fatal respiratory disease. In egg embryos, the virus caused dwarfing, thickening of the amniotic sac, and death of the embryo. Turkeys and chickens resisted the infection and developed no immunity to infectious bronchitis.—*R. T. DuBose et al. (Texas) in Poult. Sci. (May, 1958): 554.*

Surgery and Obstetrics
and Problems of Breeding

Traumatic Chylothorax in Small Animals Treated by Ligation of the Thoracic Duct

DONALD F. PATTERSON, D.V.M., and TODD O. MUNSON, V.M.D.

Boston, Massachusetts

CHYLOTHORAX is a rare condition in man and has not been reported in the dog or cat. Effusion of chyle into the pleural cavity is due to rupture of the thoracic duct, and may be caused by direct or indirect trauma, invasion of the duct by malignant or infectious processes, thrombosis of the duct or the vein into which it empties, or congenital weakness of the duct system.

Treatment of chylothorax resulting from trauma was only moderately successful in man prior to 1946.[4] Newer concepts of surgical treatment have significantly increased the recovery rate since that time.

The authors believe that traumatic rupture of the thoracic duct occurs more frequently in animals than is recognized. Three cases in dogs and 1 in a cat are described here. Attempts at transthoracic ligation of the leaking duct were unsuccessful in 1 case. Ligation of the duct in the posterior part of the chest was accomplished in 3 animals, followed by complete recovery in 2; the third animal died of complications.

ANATOMY AND PHYSIOLOGY

Lymphatic plexuses are abundant in the mucous membranes of the respiratory and digestive systems. During digestion they contain chyle, a milky fluid. The chyle is carried from the intestine through a system of collecting channels to an abdominal reservoir, the cisterna chyli, into which also drain the lymphatic trunks from other abdominal organs and the body posterior to the diaphragm.

The location and course of the cisterna chyli and the thoracic duct in the dog is not consistent. Commonly, the cisterna chyli is ventral to the last thoracic and first lumbar vertebrae and is to the right of, and dorsal to, the aorta.[6] However, it may be to the left of, or even left of and ventral to, the aorta.[2] The thoracic duct, a thin-walled continuation of the cisterna chyli, passes anteriorly through the aortic hiatus of the diaphragm.

This duct is divided into a postcardial part, to the right of the aorta, and a precardial part, to the left of the aorta. The postcardial portion may have from one to three origins; if single, divisions may go to the left and right of, and dorsal to, the aorta. These divisions, which may have several anastomoses with each other, unite after a short distance to form one thoracic duct which usually lies in the classical position,[6] dorsal and to the right of the aorta, ventral to the bodies of the thoracic vertebrae, and ventral and medial to the vena azygos.

The precardial portion may also have subdivisions, but less commonly than the postcardial part. This anterior portion of the duct passes to the left at the fifth or sixth thoracic vertebra, dorsal to the esophagus, and empties into the left brachiocephalic or common jugular vein. A valve at this opening prevents blood from entering the duct.

The anatomy of the cisterna chyli and the thoracic duct in the cat differs from that of the dog in that these structures are located dorsal and to the left of the aorta. The duct continues forward along the aorta, gradually passing to the left side where it empties into the external jugular vein. In passage through the thorax, the duct often divides into two or three parts which, after passing along parallel to each other, reunite. The duct in the cat is easily identified—the presence of numerous valves along its course give it a beaded appearance.[5]

In the dog and cat, the duct lies dorsal to the aorta in the mediastinum and thus is enclosed by parietal pleura and the intercostal arteries (fig. 1).

Flow of lymph is favored by the slightly higher pressure in the duct than in the veins and by respiratory movements producing rhythmic changes in intrathoracic pressure. Intestinal peristalsis, muscular activity, and coughing or straining increase intraductal pressure.

Part of this work was done while Dr. Patterson was an intern at Angell Memorial Animal Hospital, Boston; it was completed while he was an instructor at Oklahoma State University, Stillwater. Dr. Patterson is now at the School of Veterinary Medicine, University of Pennsylvania, Philadelphia. Dr. Munson is a staff member, Angell Memorial Animal Hospital, Boston, Mass.

ETIOLOGY OF CHYLOTHORAX

Various types of direct and indirect trauma have been incriminated in chylothorax in man. The proximity of the duct to the unyielding spine protects the duct from trauma and undoubtedly accounts for the fact that it is seldom ruptured. This same feature, however, makes the duct vulnerable to rupture by sudden hyperextension of the spine, such as often occurs in automobile accidents. Anterior dislocation of thoracic vertebrae and violent coughing attacks have been demonstrated as causes in man.

DIAGNOSIS

The first indications of chylothorax are:[1] (1) dyspnea of sudden onset (often delayed two to ten days after injury); (2) shock syndrome (pallor, thready pulse, subnormal temperature); (3) rapid and complete reaccumulation of chyle and recurrence of the signs and symptoms.

If healing does not occur spontaneously or if surgery is unsuccessful, secondary changes, and often death, occur as a result of persistent loss of fluid, protein, and fat. These secondary changes are: (1) weight loss; (2) dehydration; (3) reduction of plasma and total body protein; (4) reduction in blood and tissue fat; (5) disappearance of lymphocytes and eosinophils from circulating blood; (6) inanition, oliguria, thirst; and (7) death.

Any thoracic disease causing rapid respiratory embarrassment suggests chylothorax. Pneumothorax, hemothorax, pyothorax, cardiac disease, and thoracic tumors with complicating hydrothorax must be considered but, because both history and initial clinical signs and symptoms are so similar, traumatic chylothorax is most often confused with the more common diaphragmatic hernia.

Careful clinical examination might reveal dullness in the thorax, indicating the presence of fluid. A more accurate diagnosis is obtained by use of a standing lateral radiograph, which should reveal a fluid line that would be less obvious in a recumbent position.

Nature of Chyle.—Chyle resembles whole milk in consistency and appearance and usually has a pink, gray, or tan tinge. In the early stages, in a fasting animal, the transudate may be difficult to differentiate from serum. Upon standing, the fluid usually separates, a creamy layer rising to the top.

Microscopic examination will reveal numerous fat droplets that stain bright orange with Sudan III; a Wright-stained

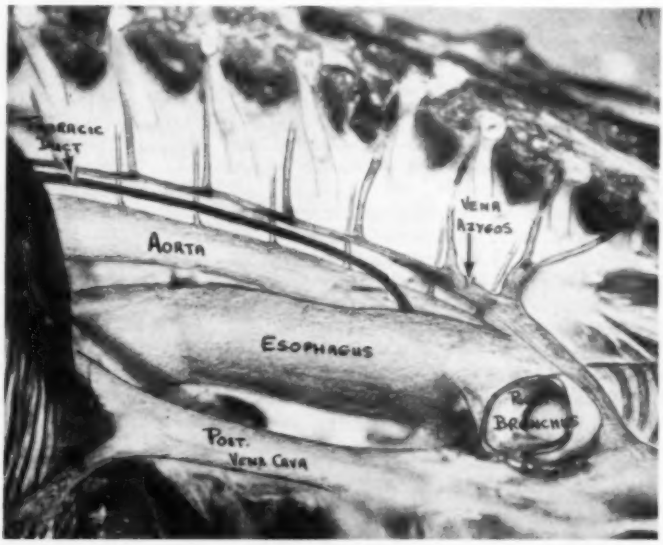


Fig. 1—Right pleural cavity of a dog with right lung removed, showing the postcardial portion of the thoracic duct and related structures.

slide will show no bacteria and only a few cells, these being mostly lymphocytes.

Grossly, chyle might be confused with some purulent material found in pyothorax, but the absence of odor and bacteria and the presence of fat droplets is diagnostic.

TREATMENT IN MAN

The treatment of traumatic chylothorax in man has evolved slowly, with a great hesitancy to attempt other than conservative supportive therapy and frequent aspiration of the chest to relieve the signs and symptoms. In a number of patients, healing was spontaneous, but more often continued aspiration was necessary for months or longer, and a high percentage terminated in death. Many methods to promote healing of the leaking duct were proposed, but they were largely ineffective and, in many cases, detrimental.

The present method of conservative treatment of traumatic chylothorax in man may be summarized as follows:

A) Prevention of the mechanical effects of chylothorax by (1) limitation of fluid intake, (2) low fat diet, (3) repeated thoracentesis.

B) Maintenance of nutrition by (1) high carbohydrate, high protein diet, (2) maintenance of fluid balance, (3) transfusion of blood, plasma, and plasma substitutes, (4) parenteral protein therapy.

The concensus now is that conservative treatment should be pursued for seven days, followed by transthoracic ligation of the duct if the results are not good.

Recently, experimental surgery on dogs and a high percentage of recoveries following ligation of the duct in cases of chylothorax in man has led an increasing number of surgeons to believe that surgical intervention is the best treatment.

SURGICAL PROCEDURE IN THE DOG AND CAT

In man, the incision is usually made on the left side between the eighth and tenth ribs. Some reports of experimental surgery on the duct in dogs also mention incision of the left ninth or tenth intercostal space. Others[3] would approach the duct in the dog through the right side of the thorax, as the relations here are the same as described in the horse.[6]

Entry through the thorax for ligation of the duct in the cat should be from the left side, as the common location of the duct in this species is the direct opposite to its location in the dog.

Direct entry into the thorax is preferred when a detailed examination of the anterior portion of the thoracic duct is desirable. When exploration of the diaphragm and abdominal viscera is important, a right or left hypochondriac incision, depending upon the species, followed by an L-shaped incision in the diaphragm over the aorta, provides access to the duct at its most posterior part.

After making an incision in the thorax, the surgeon must then identify the thoracic duct. In the cat, even though the duct is ruptured in its anterior part, intraductal pressure is maintained by the numerous valves, making it easy to identify. In the dog, the intact duct in an animal recently fed is distended and readily detected. However, in the fasted dog, the duct is collapsed and difficult to distinguish from the parietal pleura under which it lies.

Careful and gentle dissection of the mediastinum in the small area bounded by the aorta below, the vena azygos above, and the intercostal arteries anteriorly and posteriorly is necessary to avoid tearing the thin-walled duct or rupturing the intercostal arteries.

When the duct has been isolated, simple ligation is easily accomplished.

CASE REPORTS

Case 1.—On Jan. 4, 1955, a 2-year-old male Cocker Spaniel was referred to the Angell Memorial Hospital, with a tentative diagnosis of diaphragmatic hernia. Three days previously, the dog had eaten a bone and shortly thereafter had a violent coughing spell that lasted ten minutes. The next day, dyspnea became apparent, following which the dog vomited several times. The owner reported that the dog breathed easily when quiet but, when excited, it coughed and dyspnea became pronounced.

Examination showed a small, well-nourished dog that had slightly labored respiratory movements. Auscultation and percussion revealed a dullness in the ventral half of both sides of the thorax. Muffled respiratory sounds were audible in only the upper portion of each side.

Dyspnea increased upon excitement. Thoracentesis resulted in the removal of 680 ml. of free air and in improved breathing, but dyspnea was still marked. A standing lateral radiograph showed a rather distinct fluid line and 200 ml. of pink watery fluid

was aspirated from the thorax, with immediate relief of dyspnea.

Two days later, when dyspnea increased, 320 ml. of pinkish white, milky fluid was aspirated and identified as chyle by the laboratory.

For the next 18 days, the dog was treated by aspirating chyle when necessary to relieve dyspnea, with the removal of 180 to 475 ml. on an average of every three days. The dog had a good appetite, but gradually lost weight.

On January 25, the dog was prepared for surgery and an incision made between the ninth and tenth ribs on the right side. After aspiration of a quantity of chyle, the mediastinum was separated by blunt dissection and a structure thought to be the thoracic duct was ligated. The wound was closed in the usual manner.

The dog continued to eat and breathe normally until postoperative day 5, when its breathing again became labored, and it had to be placed in an oxygen cage. Chyle was withdrawn on postoperative days 6 (200 ml.) and 7 (580 ml.). On day 13, the owners requested euthanasia.

At necropsy, the abdominal organs were normal. The thorax was filled with white, milky fluid, and the entire costal pleura was coated with a fibrin-like deposit. The lungs and pericardial sac were covered with a similar deposit. The pericardial sac was filled with the milky fluid. The mediastinal and bronchial lymph nodes were enlarged about three times and, on pressure, exuded a milky fluid. The thoracic duct was identified but was torn while being probed, so the original lesion in the duct was not located.

The necropsy findings in this first case are incomplete and disappointing. There was either a failure to identify and ligate the duct, or multiple ducts existed and an intact duct was tied.

Case 2.—On Jan. 10, 1956, a male mixed Manchester Terrier, 13 months old, was presented at the veterinary clinic (Oklahoma State University) with the following history.

The previous day the dog had come home limping in the right hindleg, and presumably had been struck by a car. It refused food, seemed uncomfortable, and breathed more rapidly than normal. The following day, respiration was increasingly difficult.

Examination revealed a depressed but strong dog, breathing with a distinct abdominal lift. Lung sounds were muffled in the ventral thoracic region. Manipulation of the right hip joint seemed to cause slight pain and some crepitus in the region of the acetabulum was detected on rectal palpation. The tentative diagnosis was diaphragmatic hernia and pelvic fracture.

Standing lateral radiographs of the thorax showed increased density in the ventral portions and an indistinct diaphragmatic line. Pelvic radiographs revealed a line fracture in the region of the acetabulum and fractures of the first and second sacral vertebrae.

The animal's condition remained unchanged for the next three days but, on the fourth day, breathing became more labored and surgery was undertaken. Since the site of the supposed diaphragmatic hernia was not clear radiographically, the abdominal approach was chosen.

A midline incision was made extending from the xyphoid cartilage 6 inches posteriorly. There was no diaphragmatic hernia, but movements of the diaphragm suggested the presence of fluid in the pleural cavities. Several milliliters of pale pink creamy fluid (chyle) was aspirated from the pleural cavity through the muscular periphery of the diaphragm.

The abdominal incision was continued anteriorly to the right of the sternum and the last two costal cartilages were transected at their junction with the sternum. The incision was then continued dorsally in the tenth intercostal space, and the ribs retracted to expose the right pleural cavity. The thorax was half filled with fluid, which was removed. The right lung was retracted ventrally, exposing the dorsal mediastinum.

The thoracic duct was identified between the aorta and vena azygos and its course traced anteriorly. Dorsal to the base of the heart, at the point where the duct passes to the left, a small tear and several blood clots were found in the dorsal mediastinum. Nearly 1 ml. of chyle exuded at each deflation of the lungs, making frequent aspiration necessary.

The thoracic duct was isolated and doubly ligated with 00 chromic catgut at the level of the tenth thoracic vertebra. The flow of chyle ceased. Sutures were placed in the contiguous tissue to oppose the edges of the severed costal cartilages and the thoracic and abdominal incisions were closed in the usual manner. Air was aspirated from the closed chest during the inflation-

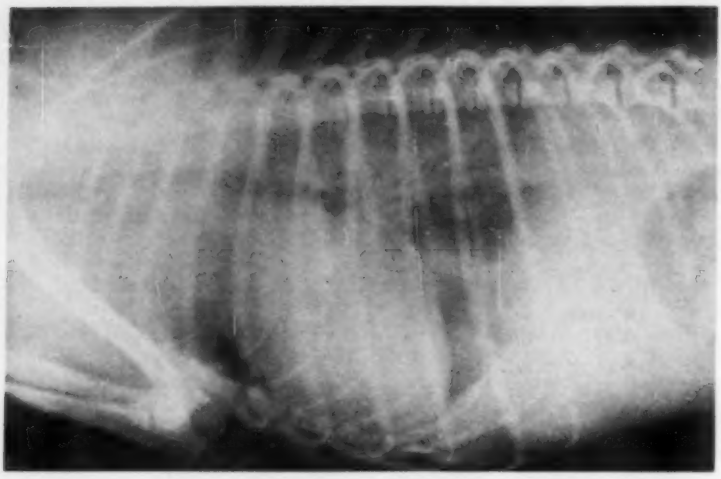


Fig. 2—Lateral radiograph of a recumbent dog, showing density of thorax and leafing of lungs, suggestive of fluid.

ary stage of resuscitation, and the resuscitator removed.

A transfusion of 250 ml. of whole blood was given during surgery and 100 mg. of oxytetracycline was given intravenously immediately following surgery.

Recovery from anesthesia was slow but the following day the dog was alert and drank water. Respiratory movements appeared normal. Thoracentesis on postoperative day 2 produced 30 cc. of clear serosanguineous fluid. No fluid was obtained on subsequent aspirations and radiographs taken on postoperative day 4 were normal. The dog was placed on P/D diet,* and oxytetracycline was given intramuscularly for three days, then orally for three days.

The dog improved rapidly, ate well, and became quite active. It was discharged on postoperative day 6, with instructions to the owners to give it a relatively fat-free diet for two weeks. When skin sutures were removed, on February 28, the dog had gained weight and was apparently normal. Three months after surgery, it was in excellent health.

*A prescription food produced by Hill Packing Co., Topeka, Kan.

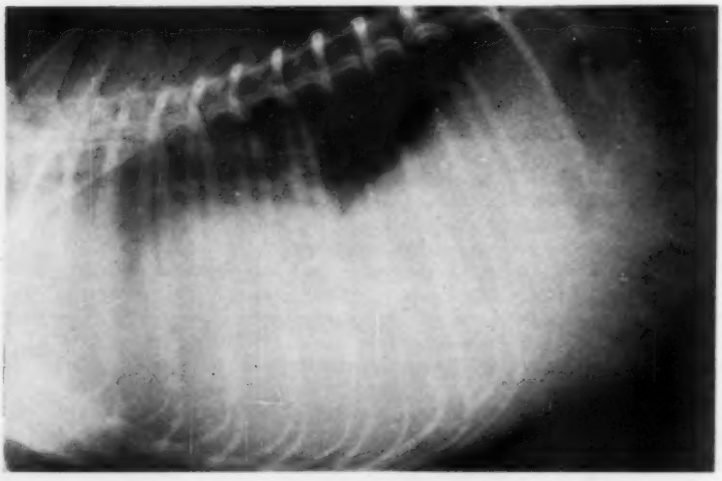


Fig. 3—Standing lateral radiograph of the same dog in figure 2, showing fluid line.

Case 3.—On Feb. 13, 1956, a male kitten, 5 months old, was presented at the Angell Memorial Hospital. Two days previously, when it leaped from the owner's shoulder to the floor, it had cried as though in pain —then, after being quiet for a short time, seemed to be normal. It had since shown slowly increasing dyspnea.

On examination, the kitten seemed to be normal except for pronounced abdominal breathing. A diagnosis of diaphragmatic hernia was made.

The next day the cat was prepared for surgery but, upon exploratory midline laparotomy, no hernia was found. The diaphragm was then incised and about 30 ml. of pink, clear fluid was aspirated from the pleural cavity. The operation was completed and the kitten was eating and breathing normally when discharged on February 19.

The cat was returned the next day because of recurrence of dyspnea. No lung sounds could be detected but, on thoracentesis, 90 ml. of pinkish white, milky fluid was aspirated, with prompt relief of dyspnea.

Respiration gradually became more labored and, on February 25, the cat was prepared for surgery and the abdomen was entered through a left hypochondriac incision. The liver was retracted, the aorta palpated, and an incision made in the pillar of the diaphragm directly over the aorta. By a second incision at right angles, the diaphragmatic wound was converted into an L-shaped opening which provided a good view of the aorta and of the beaded thoracic duct just dorsal to it. The parietal pleura was removed and the duct isolated and ligated.

The lung did not interfere with the operative procedure, as it normally would, because most of it was consolidated.

The operation was completed and recovery was uncomplicated. A radiograph taken March 1 showed some consolidation in the lower lungs, but no fluid in the pleural cavities, and the cat was breathing easily. On March 5, a radiograph showed more of the lung to be normal. The cat was discharged on March 10 but was returned nine days later showing dyspnea and depression; the temperature was normal. Thoracentesis was attempted, but no fluid was recovered. Lung sounds could not be heard.

The cat died the next day and, on necropsy, a marked inflammation and thickening of the pleura was found. The lungs were small, firm, reddish black, and completely collapsed. A small amount of red fluid, but no chyle, was present in the thoracic cavity. The ligature on the thoracic duct was intact. The diagnosis was "pleuritis with fluid exudate and pulmonary atelectasis." Histopathological study showed bronchopneumonia, atelectasis, and subacute pleuritis.

Case 4.—On March 13, 1956, a 24-lb. male Cocker Spaniel, 1 year old, was referred to the Angell Memorial Hospital clinic. The dog had been struck by a car ten days previously, and was treated for a "hunched back." It recovered but, three

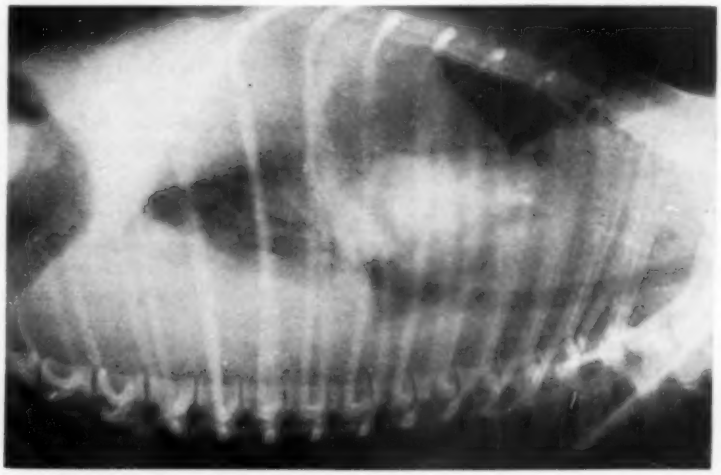


Fig. 4—A lateral radiograph of the same dog in figures 2 and 3, taken with the animal lying on its back, showing that the fluid has gravitated to the dorsal part of the thorax. This eliminates any doubt the thoracic opacity is caused by fluid.

days prior to admission, began to breathe with difficulty.

Examination revealed pink mucous membranes, a normal temperature, marked dyspnea, and no respiratory sounds in the lower chest. Palpation of the abdomen added to the respiratory embarrassment. There was considerable edema of the posterior abdominal wall and prepuce.

A standing lateral radiograph indicated that the thorax was about two thirds full of fluid and 940 ml. of pinkish white chyle was aspirated. After right hypochondral laparotomy, an L-shaped incision was made in the diaphragm over the aorta. The thoracic duct was isolated by gentle dissection and was ligated with 00 chromic gut after aspiration of 150 ml. of chyle. The operation was then completed.

The dog did not eat well in the hospital, but its temperature remained normal and there was no recurrence of dyspnea. It was discharged ten days later and has continued to act normally.

DISCUSSION AND CONCLUSIONS

The authors believe that chylothorax is probably more common than is realized. Four cases were encountered during 14 months, the last 3 within three months. That chylothorax is easily confused with diaphragmatic hernia should be kept in mind in this era of frequent motor accidents. This suggests that many animals are euthanatized because of a mistaken diagnosis of a ruptured diaphragm, where surgical facilities for repair are not available, when at least a trial period of conservative therapy would give them a chance of survival. The presence of fluid in the pleural cavities may be overlooked unless a standing lateral radiograph is taken. Both lateral recumbent and dorsoventral views fail to reveal a fluid level (fig. 2-4).

A delay of several days from the time of injury until the accumulation of chyle in dangerous amounts is not unusual. In the event of respiratory embarrassment, particularly in the absence of x-ray facilities, an experimental thoracentesis is indicated. The aspirated fluid may resemble serum early in the course of the condition, but relatively simple methods for its identification are available to all practitioners.

Failure of conservative therapy after a week's trial indicates the need for surgical intervention, although the newer concept is to forego conservative treatment and operate soon after a diagnosis is established. Any practitioner who has facilities for repair of a diaphragmatic hernia can perform ligation of the thoracic duct.

The possibility that multiple ducts may exist and that ligation of an intact branch will fail to check the leakage of chyle must be kept in mind.

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Body Temperatures in Cows During the Estrous Cycle

Daily temperatures were taken vaginally in 24 cows for a total of 54 estrous cycles, at Beltsville, Md. They were lowest just before estrus, high on the day of estrus, low at the time of ovulation, and high during the luteal phase of the cycle. In 9 cows at the end of pregnancy, there was a precipitous drop in temperature, indicating approaching parturition.

In a preliminary experiment, in which progestational steroids were injected into spayed cows, there was evidence that the progesterone elaboration of intact cows may be responsible for the cyclic and pregnancy body temperatures.—*J. Dai. Sci. (Aug., 1958): 1071.*

Pregnancy Toxemia and Steroid Therapy.—In a study of 41 ewes with pregnancy toxemia, there was no difference in survival rate or in blood glucose, blood ketones, and degree of acidosis in the animals treated with cortisone and hydrocortisone and in the untreated controls. Large doses of ACTH seemed to hasten parturition without affecting the survival rate.—*L. W. Holm in Cornell Vet. (July, 1958): 348.*

Observations on Effect of Preanesthetic Medication with Meperidine and Promazine on Barbiturate Anesthesia in an Ocelot and a Leopard

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THE BARBITURATES have been used to produce surgical anesthesia in the dog and cat for over 25 years. In the United States, sodium pentobarbital is the most widely used general anesthetic in these animals.[10]

In 1931, a feline ovariectomy and caudectomy were performed under pentobarbital* anesthesia.[12] The use of Pentothal* as an anesthetic agent of short duration was reported in the domestic cat in 1936.[15] Pentobarbital and pentothal in combination** produced surgical anesthesia for 30 to 60 minutes in the cat, an intermediate time between these two drugs.[2,9]

Administration of meperidine hydrochloride (Demerol†) and promazine hydrochloride (Sparine†) prior to pentobarbital has been reported in the domestic cat.[5] Combined administration of these agents was more effective than either injected alone.

The handling and treatment of undomesticated cats poses many problems. General anesthetics are frequently indicated but difficult to administer and their results are variable. For these reasons they often are avoided. In one instance, a dystocic tigress was assisted by means of a stout twine attached to a 10-ft. pole.[6] Castration of a male tiger without the aid of anesthetics was reported.[14] Inhalation anesthesia with chloroform was used in a tigress so that an ingrown claw could be removed.[3] In a tiger with necrosis of the tail, water was withheld for 14 days, then 35 Gm. of chloral hydrate was consumed in the drinking water and the animal was treated.[11]

One author[4] advocated the use of pentobarbital in medium- and small-sized cats but did not cite any specific instances in which the drug was used. A tigress, 3 years old, in dystocia was given 10 gr. of pentobarbital subcutaneously at the base of the tail; the ensuing narcosis enabled the attending veterinarian to deliver a fetus with forceps and a snare.

The results of experimental anesthesia of 4 lions in Germany[19] are summarized (table 1). This study was a momentous advance in the anesthesiology of large cats, since the author effected safe intravenous anesthesia. In the first two experiments, the duration of anesthesia was longer than anticipated. The age of the animals, respiratory depression due to the barbiturate, and defective detoxification in these animals were given as possible explanations. The author later recommended a shorter period (8 min.) of induction. Ether alone was not a satisfactory anesthetic.

In another series, the results of anesthesia in 2 lions and 1 tiger are reviewed (table 2).[13,20] These authors concluded that the barbiturates numal and narconumal were satisfactory anesthetic agents in large cats, but the amount required was proportionately less, by weight, than in the domestic cat and the recovery period was longer.

Another author[17] was unable to produce surgical anesthesia by spraying ether into the restraining cage of a 225- to 250-lb. dystocic lioness. After injection of pentobarbital (48 gr.) into the gluteal muscles, the ocular and carpal reflexes were still present; an additional 7 gr., via the tail vein, effected surgical anesthesia. Two large, decomposed fetuses were removed and the lioness remained anesthetized for three days. She was given supportive therapy of antibiotics and fluids and made a successful recovery.

CASE REPORTS

ANESTHESIA IN THE OCELOT

In December, 1957, a 24-lb. male ocelot, 10 years old, was acquired by the Como

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The author thanks Mr. John Fletcher, Como Park Zoo, St. Paul, for his aid and the use of the animals and zoo facilities; Dr. George W. Mather, College of Veterinary Medicine, for his encouragement and assistance; and Dr. Stephan Hrenchyshyn for translating the German articles.

*Sodium ethyl (1-methyl butyl) barbiturate; Pentothal, the trade name for sodium ethyl (1-methyl butyl) thiobarbiturate or sodium thiopental, is produced by Abbott Laboratories, Chicago, Ill.

**The proprietary name of this product is Combuthal and it is produced by Abbott Laboratories, Chicago, Ill.

†Demerol, the trade name for meperidine, is produced by Winthrop-Stearns, Inc., New York, N.Y., and Sparine is produced by Wyeth Laboratories, Philadelphia, Pa.

Fig. 1—The administration of preanesthetic medication was facilitated by restraining the ocelot against the side of the cage by plywood partitions.

Park Zoo, St. Paul, Minn. It was in poor condition with a severe paronchia around all except the dewclaws of the forefeet and some of the claws of the hindfeet. Hemorrhage was frequently noticed at the nailbeds and there was lameness in the forefeet. There were several areas of alopecia on the hindquarters. It was decided to amputate the involved nails to alleviate the animal's discomfort and to castrate the animal to prevent frequent urination about its quarters.

On Dec. 10, 1957, the ocelot was trapped in a large cage constructed of hollow aluminum bars. On December 12, at 8:15 a.m., the ocelot was restrained against one end of the cage by means of a plywood board (fig. 1) and 30 mg. of promazine and 75 mg. of meperidine were injected subcutaneously; at 8:45, there was incoordination, the pupils were dilated, the nictitating membranes extended over the corneas, and the forelegs were extended; at 9:00, 1 gr. of sodium pentobarbital (Somnopentyl‡) was given intraperitoneally; by 9:15 there was greater incoordination but the animal was still able to stand and another grain of pentobarbital was given.

The ocelot was unable to rise at 9:30 but the digital, corneal, palpebral, patellar, oral, and ear-whisker reflexes were present. It was then taken to the veterinary clinic, University of Minnesota. At 10:15, the rectal temperature was 95 F., pulse 152 per minute, respirations 20 per minute. The animal was immobilized, but the same reflexes were still present, and it stretched occa-

‡Somnopentyl (6% solution) is produced by Pitman-Moore Co., Indianapolis, Ind.

TABLE 1—Results of Experimental Anesthesia in Four Lions*

Animal No.	Age, sex	Wt. (lb.)	State of health	Anesthetic (a barbiturate**) (ml./5 lb. of body wt.)	Total and route	Duration of injection	Duration of anesthesia	Remarks
1	5 yr., Female	229	Good	After ether, 0.62	28 ml., i.v., saphenous	28 min.	About 88 hr.	Respirations 7/min., given analeptics.
				After ether, 0.62	28 ml., i.v., saphenous	14 min.	3 hr. 30 min.	.....
2	14 yr., Male	176	Chronic nephritis	0.48	17 ml., i.v., coccygeal	6 min.	1 hr. 15 min.	Standing in 3 hr. 30 min.
				0.48	17 ml., i.v., coccygeal	7 min.	Died 4 min. after injection	Nephritis, cardiac insufficiency.
3	10 yr., Female	246	Good	0.62	30 ml., i.v., coccygeal	8 min. (15 ml. in 3 min., rest in 5 min.)	1 hr. 15 min.	.....
4	2 yr., Female	216	Good	0.71	30 ml., i.v., coccygeal	8 min. (15 ml. in 3 min., rest in 5 min.)	45 min.	Standing in 2 hr.
				0.71	30 ml., i.v., coccygeal	8 min. (15 ml. in 3 min., rest in 5 min.)	39 min.	.....

*Modification of a table appearing in an article by von Bickmeier;[12] **Pernocton 5-(2-bromoallyl)-5-sec butyl barbituric acid was used on No. 1 the first time—in all other instances Eunarcon 5-(2-bromoallyl)-1-methyl-5-isopropyl barbituric acid[14] was used (N. B., in the dog a single dose of Pernocton produces anesthesia for about 1 hr. and 15 min. while Eunarcon produces anesthesia for 30 min.[13]).

sionally. The testicles were excised without additional anesthetic.

At 10:30, the temperature was 95 F., pulse 144/min., respirations 24/min.; procaine (2%) and epinephrine (1:100,000) were injected at the base of the affected nails which were then removed by dissection and the feet bandaged.

At 12:00, the temperature was 95 F., pulse 154/min., respirations 28/min.; 600,000 units of penicillin (Bicillin Fortified 300§) was given to prevent pneumonic complications before being returned to the zoo (periodically turned by attendants during recovery).

By 5:00 p.m., it was moving but unable to right itself. On December 13, at 8:00 a.m., the ocelot was ataxic but able to walk (the bandages were removed during the night). On December 28, it walked with care, licked its forefeet less frequently, and there was no bleeding from the feet. Subsequently, he made a complete recovery from paronchia and alopecia..

ANESTHESIA IN THE LEOPARD

First Experiment.—In 1956, an adult, 112-lb. male leopard was purchased by the Como Park Zoo. It was later observed to have epileptiform seizures* and was isolated. The seizures continued at intervals of two to four weeks. The veterinary staff was allowed to anesthetize the leopard prior to euthanasia.

On Dec. 28, at 8:45 a.m., the leopard seemed normal and paced continuously; respirations were 20/min.; it hissed, growled, and objected to being confined against the side of the cage with plywood boards; promazine (1,000 mg.) was injected intramuscularly.

At 9:45, it was ataxic, nictitating membranes were plainly visible, and it did not appear to resent persons in the room; it was easily confined, the tail brought between bars, a tourniquet applied at the base, and 10 gr. of sodium pentobarbital injected intravenously with minimal struggling during venepuncture and no excitement during induction; no ear-whisker or digital reflexes were observed, although the palpebral reflex was present and the ear twitched when an object was inserted into the external ear canal.

At 10:00, there were deep thoracoabdominal respirations (30/min). Penicillin (900,000 units) was given intramuscularly; at 5:00 p.m., all mentioned reflexes were still present and the animal could raise its head

§Bicillin Fortified 300 (containing benzathine penicillin G and procaine penicillin G in aqueous suspension) is produced by Wyeth Laboratories, Philadelphia, Pa.

*Similar epileptiform seizures have been reported in a lion.[10]

TABLE 2—Results of Experimental and Operative Anesthesia in Two Lions and One Tiger*

No.	Procedure	Age, sex, species	Wt. (lb.)	State of health	Anesthetic agent** (ml./5 lb. of body wt.)	Total and route	Duration of injection	Duration of anesthesia and remarks
1	Hysterectomy	5 yr., Female, Lion	198	Metritis	0.91 ml.	36 ml., i.p.	Rapid	Excitement during induction, died in 3 hr.
2	Experimental	5 yr., Male Tiger	235	Trichinosis	1.2 ml.	15 ml., i.p., 20 ml., i.v., saphenous 10 ml., i.v.	Rapid 13 min.	Surg. anesth. 4 hr., analeptics given, standing in 4 days, walking in 8 days, lost weight.
					0.57 ml.	12 ml., i.v., 15 ml., i.p., ether, cone, 170 cc.	2 min., rapid, 30 min.	Excitement during induction, surg. anesthesia 5½ hr., rising in 2 days.
	Experimental	Unknown, Female, Lion	299	Senile	0.44 ml.	20 ml.	9½ min.	Not under surg. anesth., sternal recumbency in 30 min., struggling for 2 days.
	Experimental				0.016 Gm.	0.5 Gm. 0.2 Gm.	1½ min.	Surg. anesth. ½ hr., ataxic on 2nd day.
	Cataract operation†				0.57 ml.	26 ml., i.v., ether, cone, 170 cc.	16 min. 52 min.	Analeptics given, on elbows in 54 hr., died in 2½ mo. of pulmonary tuberculosis.

*From an article by Lang;[12] **Numal, 5-allyl-5-isopropyl barbituric acid[13] (similar to Parnocton or pentobarbital or pentobarbital in its duration of action) was used on all occasions except in second experiment with No. 3 when Narconumal, N-methyl allyl-isopropyl barbituric acid,[21] similar to Eunarcon or Pentothal in its duration of action, was used; †from article by Von Brucker and Lang.[22]

and assume a sternal position but lacked the desire to rise.

On December 29, at 8:00 a.m., the leopard raised on its forelegs, drank water, and ate a small quantity of meat. At 5:00 p.m., it was not able to stand. The following day at 8:00 a.m., it was able to walk but was ataxic.

Second Experiment.—On January 10, 8:15 a.m., the leopard that had been anesthetized previously and was confined in the aluminum restraining cage appeared in good health and seemed to resent being confined at the side of the cage, but showed no greater dislike for people than on December 28; respirations were 30/min; promazine (500 mg.) was injected intramuscularly.

At 8:45, it appeared lethargic and ignored people in the room, rested quietly in ventral recumbency; thoracoabdominal respirations were 25/min., nictitating membranes covered one half of the corneal surface, and the eyes were almost closed; when plywood partitions were inserted into the cage, it did not stand but hissed.

At 9:15, pentobarbital (3½ gr., 3% solution) and thiopentyl (3½ gr., 3% solution) were injected into the caudal vein; the palpebral reflex was discernible, but the digital, ear-whisker, and ear-twitch were abolished; deep respirations were 24/min; at 9:45, the leopard righted itself and penicillin was administered as before.

Third Experiment.—On January 20, 12:30 p.m., the leopard was active and alert but did not object to being restrained by the plywood boards; promazine (500 mg.) was given intramuscularly. At 1:30, its attitude was similar to that after previous preanesthetic medication; respirations were 24/min., there was some swelling in the tail at previous sites of injection. After injection of 5 gr. of pentobarbital, the animal turned, so more could not be injected.

At 2:00, 5 gr. of pentobarbital was injected intraperitoneally; all reflexes except the righting reflex were present; respirations were 22/min.; at 2:30, 5 gr. of pentobarbital was injected intraperitoneally; ear-twitch and palpebral reflexes were present, respirations were 20/min.

Respirations were 16/min. at 3:00, the ear-twitch reflex was still present, pentobarbital (5 gr.) was given intraperitoneally. At 3:30, respirations were 6/min., all reflexes were abolished, pentobarbital (10 gr.) was injected intracardially. There was respiratory arrest in five minutes, followed by cardiac arrest.

DISCUSSION

Barbiturates have been employed successfully in the domestic cat for many years and apparently may be used in larger cats; however, intravenous injection is difficult. Big cats require less anesthetic to produce surgical anesthesia, certain reflexes may persist longer, the postanesthetic recovery is slower, and the margin of safety between the anesthetic and lethal dose may be smaller.

Intravenous administration of barbiturates is safer, following preanesthetic medication, because the desired plane of anesthesia can be reached more quickly and uniformly. Neither the ocelot nor the leopard was injured or particularly resented restraint between the plywood boards and bars of the cage once they had been treated. On subsequent trials, the animosity the leopard showed toward the people involved was not increased.

Since the leopard's tail was well muscled at the proximal third and the ventral groove extended about one fourth of the distance of the tail, there were not many sites for injection along the ventral coccygeal vein. It was discovered that if the longitudinal plywood boards were pressed tightly against the animal's body and additional boards were placed in front of the animal, the leopard could be completely immobilized by pressing a bar down on its shoulders.

The observation that large cats require less anesthetic than the domestic cat may be explained by their greater size, lower metabolic rate, relative inactivity, their diet, or species difference. An inverse logarithmic relationship in the anesthetic dose of pentobarbital for large and small domestic cats has been reported.[1]

In the leopard, the ear-twitching following external stimulus was an unusual and particularly persistent reflex. The exact relationship of this reflex to preanesthetic medication, deep surgical anesthesia, and the lethal dose can not be made on the basis of 1 animal. It has been observed that cats vary greatly in the order in which their reflexes are abolished or return. One group of investigators found marked electrical responses to peripheral nerve stimulation in the cortex of cats under deep pentobarbital anesthesia, but not under ether an-

esthesia.[7] In this instance, it would appear safer to supplement the general barbiturate anesthetic with local anesthetics.

Recovery from pentobarbital anesthesia, as measured by the return of the righting reflex, requires approximately eight hours in the domestic cat, about four hours in the dog. The long recovery time observed in large cats can be reduced with preanesthetic medication which allays excitement, potentiates the anesthetic, and facilitates intravenous administration.

Meperidine (5 mg./lb.) and promazine (2 mg./lb.) are known to have these actions in the domestic cat. Sedation is produced in the domestic cat when promazine alone (4 to 6 mg./lb.) is administered. (Twice this dose (10 mg./lb.) was injected into the leopard in the first experiment because the weight was misjudged.) The use of pentothal alone or with pentobarbital offers the possibility of varying the duration of anesthesia and subsequent recovery time.

Whether the margin of safety between anesthesia and death is really decreased can not be proved by euthanasia of 1 animal. Usually the minimum lethal dose of the various barbiturates is twice the anesthetic dose. In the third experiment with the leopard, the animal was near respiratory paralysis before all the reflexes were abolished. This supports the view that local anesthetics should be employed, whenever possible, to avoid large doses of general anesthetics. As in the domestic cat, the number and character of the respirations are important criteria with which to evaluate depth of anesthesia. Fewer than ten respirations per minute should be the cause of grave concern.

SUMMARY

The literature on general anesthesia in large cats is reviewed. Promazine (Sparine) and meperidine (Demerol) were administered as preanesthetic medication prior to sodium pentobarbital in an ocelot. Promazine was administered twice prior to pentobarbital anesthesia and once prior to combined thiopental-pentobarbital anesthesia in a leopard.

These preanesthetic agents reduced struggling, facilitated intraperitoneal injection in the ocelot and intravenous injections by the tail vein in the leopard. The 112-lb. leopard required 500 mg. of promazine and 30 gr. of pentobarbital for euthanasia.

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Breeding Ability of Male Mink After Isolation.—When male mink kits were isolated at 6 weeks of age, only 20 per cent were able to complete a mating when mature. When placed in groups of 4, from 6 to 11 weeks, then isolated, over 75 per cent were capable breeders.—*Nat. Fur News (Aug., 1958): 27.*

Clinical Data

Sensitivity of Swine and Cattle to Artificial Infection with Western Equine Encephalitis Virus

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STUDIES ON blood from domestic animals in Weld County, Colorado, have shown that a relatively high percentage of swine have neutralizing antibodies against western equine encephalitis (WEE), and precipitin tests on engorged mosquitoes of this area indicated that their blood-meals were sometimes from cattle or sheep.

During November to December, 1953, blood was collected from 57 locally raised market hogs. Neutralizing antibodies were found in 19 (33%), although none of these swine had showed overt illness at any time up to slaughter. This finding indicated that swine do develop subclinical infection and might possibly serve as a potential source of WEE virus for arthropod vectors.

A pilot study was designed to determine whether there was a viremia and antibody response as well as elevation in temperature and leukocyte changes following subcutaneous inoculation of WEE virus in both cattle and swine.

MATERIALS AND METHODS

Four young dairy heifers, 7 to 14 months old, and 4 Duroc pigs, 2 of each sex, 8 weeks old, were provided by Colorado State University. In addition, 5 pigs of mixed breed, 3 males and 2 females, 9 to 12 weeks old, were purchased.

The cattle were kept in feedlots exposed to the weather. The Duroc pigs were also kept in the open, but a house was provided for protection against inclement weather. The other 5 swine were kept in a barn, with cement floors covered with straw bedding, for the duration of the experiment. All animals were given free access to water and normal rations.

Preinoculation blood specimens were taken from the hearts of the swine and from the jugular veins of the cattle after body temperatures were recorded. Part of each specimen was oxalated for blood counts; the remainder was allowed to clot and the serum removed for neutralization tests.

Two heifers were given 17 million chick l.d.$_{50}$ of $L_{0}34aM_{1}E_{1}$ strain of WEE virus; the other 2 were given 34 million chick l.d.$_{50}$. The Duroc pigs were given 4,000 chick l.d.$_{50}$, and the other swine 42,000 chick l.d.$_{50}$. All inoculations were 0.03-ml. amounts and were given subcutaneously.

Following inoculation, the temperatures of the cattle were recorded and blood specimens were collected (for virus isolation, blood counts, and serological studies) three times a day for five days, once a day for the next five days, and once a week for the next two weeks. Blood specimens were taken from the Duroc pigs twice a day for five days, once a day for the next five days, and once a week for the next two weeks; from the other swine, once a day for seven days and once a week for the following two weeks.

Blood specimens for virus isolation were kept on wet ice for 60 to 90 minutes during transportation to the laboratory, and a portion for serological studies was removed and serial dilutions made on the remainder which were then frozen in a dry ice and alcohol bath and stored at −40 C. until inoculations into "wet" chicks. Serum for neutralization tests was stored at −40 C. until all specimens had been collected. The technique for the use of the "wet" chick for virus isolation and neutralization tests has been previously reported.[1,2,3]

The heifers and the Duroc swine were inoculated during September; the other swine during January.

RESULTS

The heifers did not develop a detectable viremia at any time. The leukocyte count remained within normal limits and there was no elevation of body temperature beyond the normal daily range. Antibodies against WEE virus were detectable in 2 heifers in the second week and again in the third week following inoculation. The neutralizing indexes are shown (table 1).

TABLE 1—Neutralizing Indexes of Cattle Inoculated with Western Equine Encephalitis Virus

Animal No.	Dose l.d.$_{50}$	Weeks following inoculation				
		0	1	2	3	4
41	17×10^6	<12	<12	280	6,300	3,980
42	17×10^6	<12	<12	<12	70	43
43	34×10^6	<12	<12	<12	63	63
44	34×10^6	<12	<12	630	20,000	10,000

The two swine groups differed in their response to the virus. The Duroc pigs, kept in outdoor pens, showed temperatures aver-

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aging from 0.2 to 1.4 degrees higher than the pigs kept inside the barn. Leukocyte counts remained within normal limits in both groups. Virus was not recovered from the Duroc pigs and they did not develop antibodies, but each of the other swine showed a viremia and a subsequent antibody response. The results are summarized (table 2).

WEE virus. Although blood was taken three times a day for five days and once a day for the following five days, virus was never recovered. Antibodies against WEE virus developed in 2 heifers two weeks following inoculation and in the other 2 in three weeks. It is concluded, therefore, that cattle do not serve as reservoirs of WEE virus for arthropod vectors.

TABLE 2—Virus Isolation and Neutralizing Indexes of Swine Inoculated with Western Equine Encephalitis Virus

Animal No.	Dose l.d.$_{50}$	Hours and blood dilution of recovered virus											Neutralizing index in weeks after inoculation				
		24	32	48	56	72	80	96	104	120	128	144	0	1	2	3	4
1	4.2×10^4	—*	ND	1/10	ND	1/10	ND	1/10	ND	1/10	ND	—	<12	630	630	1,000	ND
2	4.2×10^4	—	ND	1/10	ND	1/10	ND	1/2	ND	—	ND	—	<12	63	630	6,300	ND
3	4.2×10^4	—	ND	1/10	ND	1/10	ND	1/000	ND	1/10	ND	—	<12	12	630	1,110	ND
4	4.2×10^4	—	ND	1/10	ND	1/10	ND	1/10	ND	—	ND	—	<12	200	12	200	ND
5	4.2×10^4	—	ND	1/10	ND	1/10	ND	1/10	ND	1/10	ND	1/10	<12	12	10,000	15,900	ND
50	4.0×10^3	—	—	—	—	—	—	—	—	—	—		<8	<8	<8	<8	<8
51	4.0×10^3	—	—	—	—	—	—	—	—	—	—		<8	<8	<8	<8	<8
52	4.0×10^3	—	—	—	—	—	—	—	—	—	—		<8	<8	<8	<8	<8
53	4.0×10^3	—	—	—	—	—	—	—	—	—	—		<8	<8	<8	<8	<8

*— Signifies that no virus was recovered in any dilution; ND — not done.

DISCUSSION

Swine were artificially infected with WEE virus, without displaying overt illness. The threshold of infection was about 42,000 chick l.d.$_{50}$ doses. Subsequent to infection, neutralizing antibodies appeared within a week of inoculation but did not approach the neutralizing indexes found in experimentally infected pigeons.[2,5]

Previously, WEE virus has been isolated from a naturally infected immature pig that also proved to be infected with hog cholera.[4] Subsequently, intracerebral inoculation of WEE virus in pigs did not produce disease, but infection occurred, as shown by the development of virus-neutralizing substance in the blood.

Although the two groups of swine differed in their response to inoculation, this was probably a result of the difference in the dose of virus rather than in the breed. The dose given the mixed swine was ten times that given the Durocs. The amount of virus in the infected swine never approached the high levels found in experimental birds.

If the level of virus found in these studies is the optimum amount of virus in the circulating blood of swine, then it is usually below the amount of virus necessary to infect mosquito vectors. Thus, we may conclude that swine are not potential reservoirs of WEE virus for arthropod vectors.

The 4 heifers were unfavorable hosts to

None of the animals of either species showed any apparent illness, increase in body temperature, or leukocyte changes following the inoculation.

SUMMARY

Cattle and swine were experimentally inoculated with various doses of Western equine encephalomyelitis virus (WEE). The cattle did not develop detectable virus even though doses in the range of 34,000,000 chick l.d.$_{50}$ were given. The cattle subsequently developed neutralizing antibodies although, in 2 of the 4 heifers, the indexes were very low.

Swine seem to have a threshold of infection of about 42,000 chick l.d.$_{50}$. Virus was recovered from the blood of infected swine at 1:10 dilutions, and neutralizing indexes from 200 to 15,900 resulted three weeks after inoculation. These species are not suitable for sentinel animals and probably do not constitute a reservoir for WEE virus.

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Recovery of a Heifer with Tetanus

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A 700-lb. Holstein-Friesian heifer, 18 months old, had been on pasture for a month when the owner noticed that she was not staying with the rest of the herd. He noticed that she was bloated and attempted to remove the bloat by drenching her with a proprietary bloat mixture. When this proved unsuccessful, he called us.

CLINICAL FINDINGS AND THERAPY

When examined on May 13, 1958, the heifer showed the usual signs of tetanus—anxious expression, moderate tympany, rigidity of muscles, and extended tail. She could open her jaws about 1 inch and had great difficulty in walking. For several days she had not been able to eat or drink.

She was given 150 mg. of chlorpromazine (Thorazine*) and 3 million units of aqueous penicillin intramuscularly. At no time during the course of treatment was tetanus antitoxin used. Three hours later, the heifer seemed more relaxed, turned her head slightly, and walked more easily. Since the jaws then opened wide enough to pass a stomach tube, 1 qt. of milk of magnesia and other general medication was given in 20 qt. of water; 50 mg. of chlorpromazine was given intramuscularly. In two more hours, further improvement was noticed and an additional 75 mg. of chlorpromazine was given.

The following morning, the heifer was as rigid as she had been before treatment, so 300 mg. of chlorpromazine was given intramuscularly. When seen ten hours later, she was eating and walking easily. Although moderate tympany was still present, stomach and bowel action was improved; an additional 250 mg. of chlorpromazine was given.

On the third day, 475 mg. of chlorpromazine was given in divided doses eight hours apart. There was definite improvement in the heifer's ability to eat, drink, and move about, and no tympany was present. She was able to lie down and get up without difficulty but seemed to be extremely drowsy.

The fourth day, her temperature rose to 103 F. and evidence of lung congestion was present. Rumen action was meager and slight bloat was again noticeable, so 150 mg. of chlorpromazine was given, along with 100 mg. of prednisone and 3 million units of penicillin.

On the fifth day, the heifer's temperature was normal and she was greatly improved. She was given 175 mg. of chlorpromazine and 1 million units of penicillin intramuscularly.

By the sixth day, the heifer's appetite was nearly normal and the stiffness decreased. No medication was given.

One week later, the owner reported that the heifer was doing well except for a slight stiffness.

DISCUSSION

Since this heifer may have been affected with tetanus for several days before she was examined, this was probably a slow-developing case with a fairly good prognosis. Since many animals recover from tetanus without treatment (*see* JOURNAL, June 1, 1956, p. 540 and July, 1954, p. 70), especially cattle, the treatment can not be given full credit for the recovery.

However, the marked relaxation following each injection of chlorpromazine, allowing the heifer to take nourishment and relieving exhaustion, assured and hastened recovery.

SUMMARY

A heifer that had been ill several days had a severe case of tetanus. She was treated for five days, chiefly with chlorpromazine (Thorazine) and made a good recovery. No tetanus antitoxin was used.

Dr. Bryer is a general practitioner in Gap, Pa.

*Thorazine, product of Smith, Kline and French Laboratories, Philadelphia, Pa.

Appetite signals are believed to be due to fluctuating levels of glucose in the blood. —*Sci. News Letter (June 28, 1958)*: 411.

A Study of Penicillin Tolerance of Some Organisms Infecting the Bovine Mammary Gland

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IT HAS BEEN postulated that the widespread and frequent use of antibiotics for the treatment of mastitis in dairy cattle is inadvisable because this practice may develop antibiotic-resistant pathogens in the udder.

Although this theory seems plausible, and even though it is relatively simple to develop antibiotic-resistant bacteria *in vitro*, positive evidence of the development of the antibiotic-resistant organisms *in vivo* is lacking. Reports of antibiotic-resistant strains of organisms found in mastitis[1,2,5,6,8] have not shown that the organisms tested were from cows which had been treated repeatedly or that the resistant organisms were suspected of having been developed from nonresistant strains.

Data for an evaluation of this problem have been obtained from a long-term study at the University of Tennessee.

MATERIALS AND METHODS

For four years before the samples for this investigation were secured, the foremilk from each quarter of all milking cows in the herd (av. 42 cows) was sampled each month. The incubated milk samples were examined by the Hotis test and microscopic observation of breed smears. Quarters which appeared to be infected were then treated with 50,000 units of penicillin daily for four days (1,026 quarter treatments in four years).

After treatment for one or two consecutive months, most of the infected quarters were freed of infection, but some remained infected for more than two months. Since penicillin had been used in all infected cows over an extended period, penicillin-resistant organisms could have been developed.

Bacterial cultures were secured from quarters which remained infected after treatment.[9] Isolations were made by streaking a loopful of the incubated milk on blood agar plates and picking off typical colonies after 48 hours' incubation. The cultures were carried on Bacto-tryptose phosphate broth until tested.

Just prior to tests for penicillin resistance, the cultures were transferred three times at 48-hour intervals in tryptose phosphate broth. A loopful of an 18-hour broth culture was streaked on one fourth of a blood agar plate for each test.[6] A solution of crystalline penicillin-G was added to the blood agar at 45 C. just before pouring the plates to provide the following penicillin concentrations: none, 0.015, 0.031, 0.063, 0.125, 0.25, 0.5, 1.0, and 2.0 oxford units per milliliter.

After incubating for 48 hours at 37 C., the penicillin plates were compared with the control plate. Normal growth was recorded +, poor or spotty growth ±, and no growth −. Each culture was tested in duplicate on blood agar, or on blood agar and tryptocase soy agar. Some of the cultures were also tested in tryptose-phosphate broth containing graded concentrations of penicillin.

To demonstrate the *in vivo* sensitivity to penicillin, a pure culture of *Streptococcus uberis* was secured from a cow that had been treated for four successive months without eliminating the infectious organism. A suspension of cells of this culture grown on blood agar for 24 hours was prepared in sterile saline solution. Three quarters of the udder of a cow which had been consistently free of infection were each inoculated with approximately 400 million organisms. Quarter samples of foremilk were taken for routine tests at 12-hour intervals for three days, then daily for 14 days.

A test of the *in vitro* development of penicillin resistance was made with six cultures of penicillin-sensitive streptococci (*Streptococcus agalactiae, Streptococcus dysgalactiae, and Str. uberis*) which had been isolated from infected udders. The organisms were transferred daily into fresh tubes of litmus milk containing graded concentrations of penicillin. Transfers were made from the highest concentration at which all cultures produced acid reactions.

RESULTS AND DISCUSSION

Ten strains of streptococci isolated from infected udders of cows in the University of Tennessee herd, and two from another herd in which antibiotics had not been used, were tested for resistance in a preliminary study (table 1).

Although the species of streptococci in this test were not all identified, later tests of the University herd showed that it was free of *Str. agalactiae;* so the 10 "T" cultures were probably *Str. uberis* and *Str. dysgalactiae*. The F1 and F2 cultures from the other herd were *Str. agalactiae*.

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TABLE 1—The Response to Penicillin of 12 Strains of Streptococci Isolated from Previously Treated and Nontreated Infected Udders of Cows

Culture No.	Monthly treatments prior to isolation	Growth response at varying units of penicillin per ml. of agar				
		None	0.015	0.031	0.063	0.063 to 5.0
T1	2	+	−	−	−	−
T2	7	+	+	+	−	−
T3	1	+	+	−	−	−
T4	1	+	−	−	−	−
T5	5	+	+	−	−	−
T6	5	+	+	+	−	−
T7	2	+	+	+	−	−
T8	2	+	−	−	−	−
T9	1	+	+	−	−	−
T10	3	+	−	−	−	−
F1	0	+	+	+	±	−
F2	0	+	+	+	±	−

The results do not indicate that prior treatments had made the organisms resistant to penicillin. There was no relationship between the number of prior treatments and penicillin sensitivity. Storage *in vitro* of some cultures prior to testing may have eliminated acquired resistance to penicillin; but it is noteworthy that six of the ten early samples had given the same results when tested in graded penicillin broth when first isolated; *i.e.*, none grew at penicillin concentrations of 0.063 units per milliliter, or above.

After this preliminary study, a large number of cultures was secured for testing (table 2) by isolating organisms from previously treated udders. Most of these cultures were identified as to species only. None of the *Str. uberis, Str. dysgalactiae,* or *Streptococcus viridans* cultures grew on agar containing more than 0.031 units of penicillin per milliliter. Only one of the *Str. dysgalactiae* cultures grew at the lowest level of penicillin tested. The enterococci and micrococci, however, grew at all levels up to 1.0 unit of penicillin per milliliter.

Since none of the streptococci tested had shown notable penicillin tolerance *in vitro,* the possibility of a difference between *in vivo* and *in vitro* resistance was considered. Since the udder might afford some protection to the organisms against penicillin, a cow with a noninfected udder was inoculated with a *Str. uberis* culture isolated from an udder which had remained infected in spite of repeated treatments.

Signs of clinical mastitis were evident in the three treated quarters 12 hours after inoculation. The uninoculated quarter remained free of infection. In 72 hours, there were signs of acute clinical mastitis, milk production had decreased more than 50 per cent, and the cow's temperature was 105.2 F.

Four hours later, the first of four daily infusions of 50,000 units of penicillin in distilled water was given in each of the inoculated quarters. A marked improvement was noticed in 24 hours and, by 72 hours after the last treatment, the leukocyte content of the milk had approached normal and the milk yield was increasing. The udder remained free of infection and milk production was normal until the cow was slaughtered four months later.

Thus, the test organism was not able to resist penicillin treatment *in vivo* in another cow although it seemed to have done so in the donor. Therefore, the failure of penicillin to clear infection from the original udder was probably due to failure of the antibiotic to reach all the foci of infection in adequate amount.

TABLE 2—The Response to Penicillin of 68 Identified Cultures of Udder Streptococci and 12 Micrococci Isolated from Infected Udders Which Had Not Responded to Two or More Monthly Treatments with Penicillin

Type of organism	No. of cultures	No. of cultures growing on agar containing penicillin of varying units per ml.							
		0	0.015	0.031	0.063	0.125	0.25	0.5	1.0
Str. uberis	30	30	30	17	0	0	0	0	0
Str. dysgalactiae	27	27	1	0	0	0	0	0	0
Str. viridans	7	7	7	7	0	0	0	0	0
Enterococci	4	4	4	4	4	4	4	4	4
Micrococci	12	12	12	12	12	12	12	12	12

Since no strains of penicillin-resistant mastitis streptococci were found (except enterococci), an attempt was made to develop penicillin resistance in streptococci grown in milk *in vitro.*

None of six cultures from udders with clinical mastitis grew in litmus milk con-

taining more than 0.0075 units of penicillin per milliliter at the first inoculation. By inoculating new culture tubes from those showing growth in the presence of penicillin, these cultures were all growing within ten days in milk containing 0.25 units of penicillin per milliliter; and in three more days they grew in milk containing 1.0 unit per milliliter. By subsequent transfers, it was possible to grow all of these strains in milk containing 5.0 units of penicillin per milliliter.

This showed that the constant culturing of certain mastitis streptococci in the presence of penicillin can produce penicillin resistance. Since no penicillin-resistant strains were isolated from treated udders, it must be assumed that if these organisms ever were penicillin-resistant that property was not retained after they were grown in the absence of penicillin.

This series of experiments has not confirmed or denied that penicillin-resistant organisms were produced by routine treatments for mastitis. The *in vitro* results have demonstrated that possibility. The testing of cultures from treated, infected udders, and the effective curing with penicillin of experimental mastitis produced by such a culture both cast doubt upon the practical importance of induced penicillin resistance in mastitis streptococci. These observations are in agreement with those of others.[2,3,6]

The high percentage of enterococci and micrococci resistant to 1.0 unit of penicillin per milliliter (table 2) may have been influenced by prior treatment of the udders from which the isolates were secured. It has been reported[1] that 98 per cent of micrococci from subclinical mastitis were sensitive to penicillin; and also that failure to clear micrococci from the udder by penicillin was not due to penicillin-resistance, since micrococci both before and after treatment were inhibited by discs containing 0.5 units of penicillin.

This indicates the possibility, as previously suggested,[7] that the organisms which showed the most resistance to penicillin in this study may have been naturally more resistant before treatments were started in the herd. It has also been shown[4] that some micrococci and coliforms from mastitic udders were relatively resistant to penicillin prior to any treatment.

A popular explanation for failure of antibiotic treatments to cure or improve clinical mastitis has been the assumption that resistance to penicillin or other antibiotics has developed in the infectious organisms *in vivo* due to repeated treatment. Experimental evidence does not support this assumption. Such treatment failures are more apt to be due to failure of the antibiotic to reach the focus of infection in effective amount, or to infection with a naturally antibiotic-resistant organism. This study indicates that the former reason is the more likely. A recent report of the penetration of radioactive penicillin in diseased udders[10] indicates that poor penetration may be common in clinical mastitis.

SUMMARY

Streptococci isolated from infected udders in a herd which had been intensively treated with penicillin did not show unusual resistance to penicillin *in vitro*.

By culturing organisms isolated from mastitic glands in increasing concentrations of penicillin, resistance was developed *in vitro*.

Infection with a strain of *Streptococcus uberis* from an udder which had not been cleared by repeated penicillin treatment was easily controlled in another experimentally infected udder.

Micrococci and enterococci from infected udders showed much greater tolerance to penicillin than did the usual mastitis streptococci.

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The Use of the Modified Whiteside Test as a Screen Test for Bovine Mastitis

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ONE OF THE major difficulties in devising a reliable diagnostic test or procedure for the detection of bovine mastitis is the definition of this disease entity. Unless the definition of mastitis is restricted or specified, or the exact purpose of any diagnostic procedure is defined, there will continue to be considerable confusion and argument regarding the efficacy of the diagnostic procedure.

Etymologically, the term "mastitis" refers to inflammation in the mammary gland. However, the term is often used in other than its etymological sense. The dairyman may use the term only when he sees "garget," abnormal milk, or "hard" quarters. A diagnostician might report mastitis when he is able to culture certain microorganisms from the cow's milk, even though there is no evidence of inflammation.

Another diagnostician might report mastitis when he can demonstrate an inflammatory reaction within the mammary gland even though no bacteria usually associated with mastitis are demonstrated. A third diagnostician may report mastitis only when he can demonstrate certain microorganisms in conjunction with inflammation.

Thus, it is evident that a test devised to detect only inflammation will not be a satisfactory test for the diagnostician who bases his diagnosis of mastitis on the presence of certain microorganisms. By the same token, a test devised to detect certain microorganisms will not be a satisfactory test for the diagnostician who bases his diagnosis on the presence of inflammation within the mammary gland.

In one extensive review, nearly all of the diagnostic methods described are based on altered chemical or physical properties of the milk.[3] The Whiteside test[10] is based on altered milk composition. This test was modified[4] to simplify its mechanics and interpretation. Another modification[7] is called the field Whiteside test. Still another modification of the Whiteside test[9] is called the California Mastitis Test (CMT).

The studies to be described were undertaken to compare one of these indirect diagnostic tests with bacteriological and cytological diagnostic procedures. Since the initiation of the work antedated the CMT, the modified Whiteside test (MWT) was employed as the indirect test. Some CMT reactions were compared with those of bacteria isolated from the same quarters when this test became available commercially.

The MWT results were compared with the total leukocyte count and bacteriological findings of quarter samples from five field herds. The MWT was also employed in a series of experiments as an index of udder inflammation resulting from the introduction of three viral agents.

MATERIALS AND METHODS

The MWT was performed as described.[7] The surface of a glass plate was etched into 1½-inch squares such as that used for Brucella agglutination testing. Five drops of the cold milk sample to be tested was placed in the center of a square

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and 2 drops of either 4 per cent sodium hydroxide or 4 per cent potassium hydroxide was added. This mixture was then stirred into a circular spot about 3 cm. in diameter.

It had been suggested[7] that these tests could be read after they dried on the plate. However, the tests seemed more difficult to read after drying. Six degrees of reaction were recorded.[1]

Total leukocytes were counted[8] on most of the milk samples that were subjected to the MWT. The smears were stained with hematoxylin and eosin to facilitate differentiation between granulocytes and other leukocytes. The smears were examined with an oil immersion objective (1.8 mm.). One cell per oil immersion field was equivalent to approximately 500,000 cells per milliliter of milk, with the microscope used.

Quarter samples were collected in sterile 15-ml. screw-capped vials containing 0.25 ml. of 0.25 per cent aqueous solution of brom cresol purple for bacteriological examination. The presence of *Streptococcus agalactiae* in the milk was indicated by small yellow clumps adhering to the sides or bottom of the vial following 18 to 24 hours' incubation at 37 C.[2]

After incubation, blood agar plates were streaked with milk from each vial and incubated at 37 C. for 18 to 24 hours. The blood agar medium consisted of 5 per cent citrated bovine blood in blood agar base (Difco).

At the end of the incubation period, the plates were observed for the presence and type of bacterial growth. Bacteria were grouped as streptococci (groups B and C), micrococci (nonhemolytic micrococci-coagulase negative), staphylococci (hemolytic micrococci-coagulase positive), coliforms, and bacilli.

Five dairy herds, 21 to 54 lactating cows each —a total of 166 animals—were employed for the purpose of comparing the various diagnostic methods.

In addition, modified Whiteside tests, cell counts, and bacteriological procedures were completed on quarter samples taken from 19 cows that were utilized in a viral mastitis experiment.[3] Frequent testing indicated that the mammary glands of these cows were normal and free of infection with streptococci and coagulase-positive staphylococci.

Two diagonally-situated quarters on each of these cows were infused with either vesicular stomatitis virus (VSV), 16 quarters; vaccinia virus (VAC), 12 quarters; Newcastle disease virus (NDV), six quarters; or normal chicken embryo allantoic fluids, four quarters.

The four quarters infused with normal allantoic fluid served as inoculated controls, whereas the two quarters in each cow that were not inoculated served as uninoculated controls. These animals were observed after inoculation for evidence of systemic reaction, udder inflammatory response, persistence of virus, and appearance of antibody.

The CMT was performed on 592 quarter samples and results were compared with the bacteria isolated from the same quarters in the same manner as described with the MWT. Total counts of leukocytes were not made on these samples. The CMT was performed as described,[9] using the Mastest* solution and sampling paddle.

About 2 to 3 ml. of milk was drawn directly from the quarter into the respective cup on the paddle. An equal amount (approx.) of the test reagent was added with a polyethylene wash bottle. The milk and reagent were mixed by a circular motion of the paddle and the reaction scored according to the scale described.

RESULTS

The bacterial flora of the milk from 868 quarter samples taken in the field were compared with the MWT reactions obtained from duplicate quarter samples. The results of this comparison indicate that there is little, if any, correlation between the degree of MWT reaction and the bacterial flora of milk (table 1).

TABLE 1—Comparison of the Modified Whiteside Test (MWT) Reaction with Bacteria Isolated from 868 Quarter Milk Samples Obtained from Field Herds

Organism isolated	No. of quarters infected	Quarters with 1+ or greater MWT (%)
Staphylococcus (coag.*+)	134	24
Streptococcus	131	53
Micrococcus (coag. −)	125	21
Coliforms and bacilli	364	8
Yeast	4	75
Sterile	110	18

*Coagulase.

Bacteriological determinations and MWT reactions were observed on 826 quarter samples from the cows inoculated with virus. Positive (1+ or greater) MWT reactions were found in the milk from all inoculated quarters. The positive reactions persisted about three days in those quarters inoculated with normal allantoic fluid, four to six days in the quarters inoculated with VSV, ten to 12 days in the quarters inoculated with NDV, and 14 days in the quarters inoculated with VAC. Bacteria usually associated with mastitis were not found in the milk of these animals nor did the bacterial flora change significantly during the course of the virus infection.

Total counts of leukocytes were compared with the MWT reactions from 556 quarter samples taken from field herds and 826 quarter samples taken from the cows inoculated with virus. The data indicates (table 2, 3) that there is a general correlation

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TABLE 2—Comparison of the Modified Whiteside Test (MWT) Reaction with the Cell Counts from 556 Quarter Milk Samples Taken from Field Herds

MWT reaction	Range of total cell counts*	Granulocytes**
—	0.0-3.4	0.0-2.9
T	0.0-3.6	0.0-2.9
1+	0.44-15.0	0.14-11.8
2+	0.9-21.6	0.32-20.0
3+	3.0-31.0	1.5-29.0

*No. indicates average number of cells per field: one cell per field equivalent to approximately 500,000 cells per milliliter; **mostly neutrophils.

between the degree of MWT reaction and the number of leukocytes in the milk sample. However, this data also indicates that a specific degree of MWT reaction can not be related to a specific number of cells in a milk sample.

TABLE 3—Comparison of the Modified Whiteside Test (MWT) with the Cell Counts from 826 Quarter Milk Samples Taken from Cows Inoculated with Virus

MWT reaction	Range of total cell counts*	Granulocytes**
—	0.0-2.4	0.0-0.16
T	0.025-2.53	0.0-1.6
1+	0.17-10.8	0.0-7.4
2+	0.88-28.0	0.04-23.4
3+	3.24-34.75	0.135-21.7

*No. indicates average number of cells per field: one cell per field is equivalent to approximately 500,000 cells per ml.; **mostly neutrophils.

The data in these tables indicate that, generally, as the MWT reaction increases, the number of cells in the milk also increases. Wide ranges in the number of cells present occur for various degrees of MWT reaction.

The bacterial flora of the milk from 592 quarter samples taken in the field were compared with the CMT reactions obtained from duplicate quarter samples. The results of this comparison are recorded (table 4). The CMT reaction was not compared with the MWT reaction from the same quarters nor with the total counts of leukocytes.

TABLE 4—Comparison of the California Mastitis Test (CMT) Reactions with Bacteria Isolated from 592 Quarter Milk Samples Obtained from Field Herds

Organism isolated	No. of quarters infected	Quarters with 1+ or greater CMT (%)
Staphylococcus	66	76
Streptococcus	73	66
Micrococcus	285	46
Coliforms and bacilli	230	33
Sterile	18	55

DISCUSSION

The significance of a positive MWT reaction can not be elucidated by the results of the described experiments. It does not seem reasonable to assume that it is entirely a function of the leukocytes. The degree of MWT and CMT reaction has been considered a function of the total number of leukocytes and percentage of polymorphonuclear leukocytes. The variation in the cell count—MWT reaction relationship may be due to such substances as fibrin.[7] It was suggested that the positive MWT reaction was caused by the adsorption of fibrin onto the leukocytes in the milk.[5] Other factors may also be involved.

Until the mechanism of the MWT reaction is positively determined, the interpretation of the various MWT reactions can not be made. The stage of lactation of each cow tested with the MWT should be known because the test seems to be even less reliable during early and late lactation. This is usually attributed to a higher number of leukocytes at these periods of lactation.

It appears to the authors that the MWT and CMT can contribute little to a program designed to eliminate certain microorganisms from the udder. The data in table 1 are in general agreement with similar data presented by others,[8] who reported the percentage of positive MWT reactions from quarter samples containing the various bacterial isolates as follows: *Str. agalactiae*, 53.0 per cent of quarters containing this organism had 1+ or greater MWT reaction; micrococci (coagulase positive), 50.5 to 53.0 per cent; micrococci (coagulase negative), 20.0 per cent; no significant bacteria, 14.5 per cent.

If bacteriological examinations are to be performed on only those quarters giving positive MWT or CMT reactions as suggested,[9] then a large number of quarters containing streptococci and staphylococci, which are usually associated with bovine mastitis, will go undetected and serve as reservoirs for reinfection.

According to the above data, one could miss 50 per cent of the streptococcic-infected quarters and 50 per cent of the staphylococcic-infected quarters by depending on the MWT to indicate the quarters that are to have bacteriological examinations. This type of diagnosis is hardly compatible with any eradication or control program.

Also, according to the foregoing data, positive MWT reactions were recorded in approximately one sixth of the quarter milk samples from which significant pathogenic bacteria could not be cultured. These reactions are usually attributed to animals that are just beginning or ending lactation, that have been recently treated, or that have suffered some kind of local trauma. We should also keep in mind that these positive reactions may be "false positives," there being no inflammation in the udder, or that there may be inflammation that is being caused by some agent not detectable by ordinary bacteriological methods. This suggests that the eradication of bacterially induced bovine mastitis may not eradicate bovine mastitis.

Limited trials with the CMT have yielded results similar to those obtained with the MWT except that, in all cases, the percentage of positives is approximately 25 per cent greater with the CMT. A true comparison can not be made since the two tests were not performed on the same quarter samples. At first glance (table 1 vs. table 4), it appears that the CMT will detect more of the quarters infected with staphylococci and streptococci than the MWT. However, when the other bacterial categories are compared, the significance of this increased percentage is not clear.

The individual interpretation of what constitutes a positive CMT appears to be a serious problem. In our opinion, the CMT reaction is more difficult to classify than the MWT reaction.

SUMMARY

The modified Whiteside test (MWT) and a limited number of California mastitis tests (CMT) have been compared with the total counts of leukocytes and the bacteria isolated from the same quarter samples. Little, if any, specific correlation exists between the MWT or CMT and the counts of leukocytes or the types of bacteria which can be isolated.

Tests (MWT and CMT) which apparently detect only inflammatory products have limited value in a program planned to eradicate or control bacterially induced mastitis.

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Mycotic Mastitis.—Mastitis was artificially induced in goats and cows by intramammary injection of strains of *Cryptococcus neoformans* isolated from human beings and cows with mastitis. The incubation period was seven to 16 days. Some other fungi set up only a transient mastitis but the organism persisted in the milk for long periods; others caused no clinical changes and did not persist in the milk. In some cases, when penicillin was given before, during, or after experimental infection with *Candida tropicalis*, the growth rate and pathogenicity of the fungus was increased.—*Vet. Bull. (March, 1958): Item 717.*

Streptococcic Bovine Mastitis in Italy.—A bacteriological survey of 40 dairy farms in the province of Milan revealed streptococcic infection in 68 per cent of the 2,507 cows. There was no significant difference in the percentage of infection in large or small herds or between breeds, but infection did increase with age (51.8% in cows under 5 years, 71.4% in those between 5 and 8 years, and 79.5% in older cows). Of the 4,167 infected quarters, clinical lesions were found in 38.36 per cent.—*Arch. Vet. Ital. (Dec. 31, 1954): 481.*

A Method for Graphic Measurement of the Physical Forces and Differential Pressures in Mechanical Milking Systems

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INVESTIGATIONS concerning the relationship of milking machines to the mastitis problem have called attention to the need for a critical and graphic method for measuring the physical forces and differential pressures in mechanical milking systems. The method must be applicable to the machinery on the dairy farm to demonstrate inefficiency and wear in equipment.

It is the purpose of this paper to describe such a method, to present examples of the types of visual records obtainable, and to discuss their interpretation.

MATERIALS AND METHODS

An instrument that meets the need expressed above is the Strain Gage Amplifier,* described as a single-channel recording system with a dual-speed adapter for 5 mm. and 25 mm. per second and a transducer for measuring either air or liquid pressures (fig. 1).

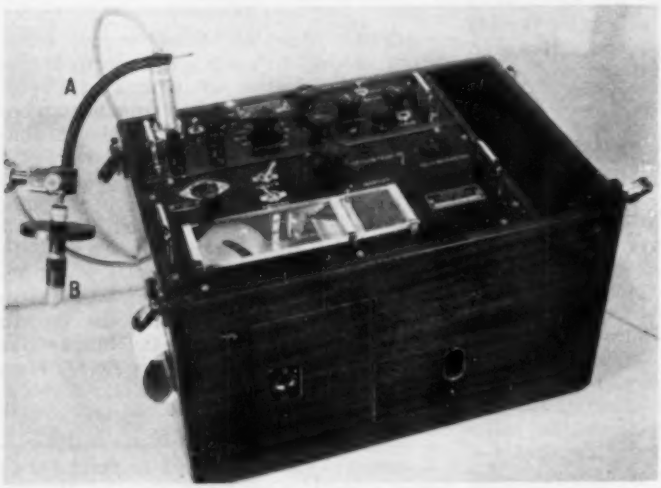

Fig. 1—The Strain gage amplifier—needle for measuring differential air pressures in the pulsator line and milking system (A); artificial teat for comparative measurement of the physical force of the liner in collapse (B).

The instrument produces a clear inkless record, by means of a heated stylus, on plastic-coated Perma-paper charts. The paper on which the records are obtained is marked off horizontally and vertically into 1-mm. squares with heavier lines at 5-mm. intervals. The instrument was adjusted before each test so that 15 inches of negative mercury pressure deflected the stylus 19 vertical mm.; with this adjustment, 1.26 mm. would equal 1 inch of vacuum. The speed of the graph paper under the stylus was set at 25 mm. per second, from which elapsed time can be determined.

The recording of air pressures in the milking machine was accomplished by attaching a short rubber hose fitted with a sharp needle to the transducer (fig. 1A). Pulsator action was recorded by inserting the needle through the wall and into the lumen of the teat cup air-hose. Pulsators that act on all four teat cups simultaneously in the same phase were tested by inserting the needle into the air-hose of a single cup. Pulsators that act alternately upon paired teat cups were tested by checking one member of each pair. Recordings of pulsator graphs were made with all teat cups hanging in a shut-off position (graph 1-4).

The vacuum level in the internal chamber of the teat cup was recorded by inserting the needle through the milk hose at the point where it protrudes from the metal shell; the needle was pushed upward until it was within the chamber of the liner (graph 6 B, B', and C).

Variations in vacuum level in the milk hose leading away from the claw were recorded by inserting the needle into the lumen of the milk hose (graph 6A).

The physical force with which liners of various

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designs collapse against the teat (graph 5) may be recorded comparatively by constructing the attachment shown at figure 1B, with a finger from a surgical glove fastened to a piece of heavy rubber tubing. The rubber tubing projects through a tight-fitting circular rubber disk, which will seal the top of the teat cup when the artificial teat is inserted into the lumen of the liner.

The area of the exposed portion of surgical rubber, which forms a compressible bulb, is important. If the area is excessive, the comparative differences in the physical force applied by different liners in collapse are not readily detected. The artificial teat is filled with water and attached to the transducer as shown at figure 1B.

Interpretation of the Pulsator Differential Pressure Graph.—A typical graph produced by one complete cycle of one type of pulsator is shown in graph 1. When the pulsator vacuum extends into the outer chamber of the teat cup, the rubber liner opens and this is called the milking phase. This action is indicated by the downward sweep of the stylus to form the portion of the graph designated A-A'-B. The horizontal portion A'-B represents the period during which the liner is fully expanded.

As the pulsator directs air into the outer chamber of the teat cup, the liner begins to collapse; the graph line moves upward, B-B', reaching its maximum level, B', when full atmospheric pressure has been attained in the teat cup outer chamber. The length of time the liner remains in complete collapse against the teat is represented by B'-A.

The speed with which the liner opens or closes and the durations of the fully expanded phase or completely collapsed phase can be ascertained by determining the number of linear millimeters encompassed by the particular action. All pulsator graphs were recorded at a speed of 25 mm. per second or 1,500 mm. per minute. Thus, in graph 1, A-A' = 4/25 second; A'-B = 11/25 second; B-B' = 9/25 second; and B'-A = 7/25 second. A total of 31 linear mm. was required for one complete pulsation; 1,500 ÷ 31 = 48 pulsations per minute.

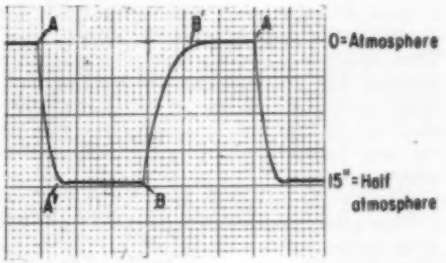
In evaluating a pulsator graph, attention should be given to the speed of opening of the liner, duration of the milking phase, and the speed, ease, and duration of the liner collapse phase. Fast recovery of the liner to the fully expanded position is indicated by a short A-A' interval.

The momentum of the liner in collapse against the teat is related to the interval B-B'. A very short B-B' interval would suggest forceful collapse, whereas an arching over of the graph line as full atmospheric pressure is attained suggests an easing of the liner against the teat. Speed of milking is increased by shortening the A-A' and B'-A intervals of the pulsation cycle.

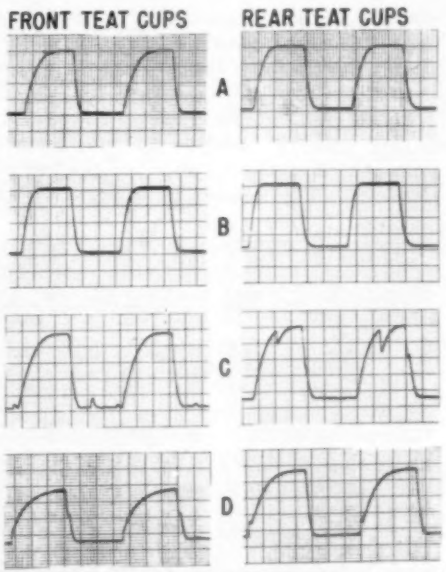
PULSATOR GRAPHS FROM DAIRY FARMS

Claw Pulsator, Electrically Controlled.—This type of pulsator milks the front and rear quarters alternately. Graphs of four pulsators of this type are presented in graph 2. The action of the front pair of teat cups is shown on the left and that of the rear pair on the right. The paired graphs A are typical of this pulsator in good condition. Notice that the pattern of collapse of the liner is not the same for front and rear teat cups, *i.e.*, the liner closing time, B-B', is 8/25 second for the front teat cups and 6/25 second for the rear cups. This indicates a slightly more rapid collapse of the liner on the rear teats.

The paired graphs B were produced with



Graph 1—A typical pulsator graph—liner opening (A-A'); open phase of liner (A'-B); liner closing (B-B'); collapsed phase of the liner (B'-A).



Graph 2—Claw pulsator graphs—pulsator in good condition (A); air intake port of pulsator increased in size (B); defect in electrical system controlling the pulsator (C); pulsator with worn piston chamber (D).

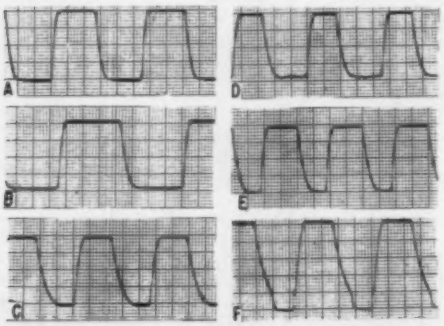
a claw pulsator that was altered by increasing the size of the air intake port. This alteration is commonly made in this pulsator by a distributor of milking machine equipment in one of the large milksheds in California. Increasing the size of the air intake port permits full atmospheric pressure in the outer chamber of the teat cup to be attained more quickly.

This action is reflected in the graphs by a 50 per cent reduction in the B-B′ interval of both front and rear teat cups. Milking time is not altered but the liners collapse with increased momentum, and this causes the teat cups to exhibit a jerking motion with each pulsation.

The paired graphs C reflect a defect in the electrical system which activated the pulsator. A broken brush or defective timing switch may lead to momentary loss of impulse, producing a flutter in liner action.

The paired graphs D were produced by a pulsator with a worn piston chamber. The air intended for the outer chamber of the teat cups partially bypassed into the vacuum system. As a consequence, full atmospheric pressure was not attained in the teat cup and the liner failed to collapse completely. More or less constant vacuum was applied to the teats and massage was ineffective. With this particular pulsator, the defective action was reflected to a greater degree in the front teat cups than in the rear cups.

Suspension Machine Pneumatic Pulsator.—This pulsator operates all cups simultaneously in the same phase of the pulsation cycle. The number of pulsations per minute can be adjusted at will by the milker. Six graphs obtained with pulsators of this type are assembled in graph 3.



Graph 3—Suspension machine pulsator graphs—pulsators in good condition and operating at 55, 40, and 68 pulsations per minute (A, B, C); worn or dirty pulsators (D, E); pulsator operating at 20 inches of vacuum (F).

Graphs A, B, and C represent pulsation speeds of 55, 40, and 68 per minute, respectively, obtained with pulsators in good condition. Graph C, which shows a comparatively slow opening phase of the liner, A to A′, was found to be typical of pulsators purchased prior to 1949, many of which are still in use. The closing phase of the liner, B-B′, in all three graphs is about 3/25 second, indicating a quick collapse against the teat.

Graphs D and E represent sluggish action due to wear or the accumulation of oil and dirt, or both. Graph D shows a short collapse and a long milking phase, while the reverse is true in graph E.

Graph F was produced with a pipeline pulsator in a system that had been modified by the owner to give 14 inches of vacuum in the milk line and 20 inches in the pulsator line.

Master Pulsation Systems.—A single pulsator is employed to operate more than one machine. The pulsator is fixed in a central area and moves the air to and from the machines via the pulsator line to the stall cocks. The volume of air to be moved with each pulsation cycle is conditioned by the length and diameter of the pulsator line, the length and diameter of the rubber hoses connecting the pulsator line to the teat cups, the volume of the teat cups, and the number of machines in operation.

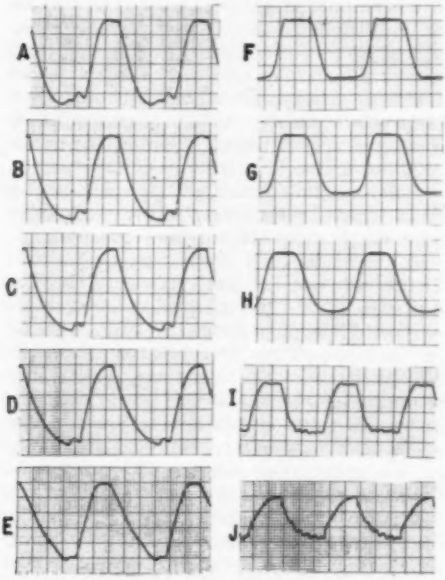
In graph 4, the graphs from three different master pulsation systems are assembled. The series A through E was obtained in a conventional 16-cow, tail to tail barn. A dual pulsator operating from one motor serviced eight stall cocks. Each unit of the dual pulsator serviced four stall cocks and, when one pulsator of the pair was in the vacuum position, the opposite pulsator was in the air intake position. As the changeover from vacuum to air occurred between the dual pulsators, a slight "pip" appeared in the graph immediately before the collapse phase of the liner begins.

Graphs 4A, B, C, and D** represent the change in pulsator wave patterns as one, two, three, and four milking machines, respectively, were attached to the four stall cocks serviced by one unit of the dual pulsator.

Graph 4E** was obtained with three machines on one side and the fourth machine

on the other side of the dual pulsator. These graphs demonstrate that, as the number of machines is increased, the opening and closing of teat cup liners become more and more sluggish. Speed of milk removal is reduced and massage to the teats may not be as effective.

Graphs 4F, G, and H were obtained on a master pulsation system in a parlor barn. The length of the pulsator line was shorter than in the conventional barn and, thus, less volume of air had to be moved. Graphs



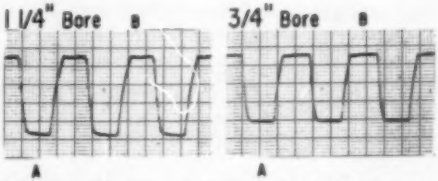
Graph 4—Pulsator graphs obtained with master pulsation systems—variation in pulsation pattern as one to four milking machines were added to the system (A-E); master pulsations in parlor barn with 1, 2, or 3 machines attached (F-H); master pulsation with differential vacuum system with one and four machines attached, respectively (I, J).

4F, G, and H are pulsation patterns produced by one, two, or three machines, respectively, attached to the system.

Graphs 4I and J are representative of a master pulsation system employing differential vacuum. The pulsator line contains a riser in which a weight has been inserted. The vacuum must lift the weight before it reaches the pulsator. Vacuum level in the outer chamber of the teat cup is always less than in the internal chamber so that the liner hugs the teat and does not open completely.

Graph 4I is the pulsator wave pattern with one milking machine attached and graph 4J is representative of the wave pattern with four machines attached. The series of "pips" in the milking phase of the graphs was produced by vibration of the weight inserted in the vacuum line leading to the pulsator to provide the differential vacuum.

Effect of Liner Diameter on Physical Pressure Applied to the Teat.—The importance of liner design and diameter in mastitis prevention and control has been stressed previously.[1-3] An attempt was made to compare the physical pressures applied by two liners of different sizes to the artificial teat described under materials and methods. A single milking machine was fitted with rubber liners 1¼ inch and ¾ inch in diameter, and the vacuum level was controlled at 15 inches. The artificial teat was inserted into the liner to be tested while the other three cups were hanging in the shut-off position.



Graph 5—Influence of diameter of the liner on the pressure applied to the teat by the liner in collapse—collapse phase (A); open phase (B).

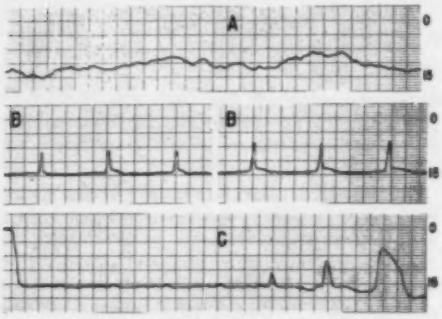
Graph 5 presents two graphs obtained with the liners of two different sizes. In these graphs, the direction of movement of the stylus is reversed from that in the pulsator graphs. The stylus is deflected downward upon collapse of the liner, followed by a return to the upper level as the liner opens.

A greater deflection of the stylus occurred when the liner of large diameter was tested. This is interpreted to mean that a harder squeeze was placed upon the compressible rubber bulb of the artificial teat by that liner. Since the area of the bulb under vacuum was not known, the pressures per square inch of surface area, as applied by the two liners, can not be stated in specific terms.

**This system was operated at 15 inches of vacuum. The stylus of the amplifier was not adjusted to record 19 mm. for 15 inches of vacuum as was done with all other recordings.

MEASUREMENT OF FLUCTUATING VACUUM LEVEL WITHIN THE MILKING SYSTEM

Pipeline System with a Two-Foot Riser.—The lift of milk in a riser interferes with the maintenance of a controlled vacuum level. In graph 6A, the vacuum in



Graph 6—Vacuum fluctuations in the milking system—in milk hose of pipeline system with a 2-foot riser (A); vacuum drop in teat cup with each pulsation when liner milk tube has 9-mm. bore (B); when liner milk tube has 7-mm. bore (B'); vacuum changes in teat cup at end of milking when machine is removed by constricting liner milk tubes while liner is pulsating (C).

the milk hose leading from the claw to the pipeline fluctuated between 15 and 8 inches during a period of six seconds covered by the recording. The claw contained an air admission hole so that there was no problem of movement of the milk out of the milk hose into the pipeline. The fluctuation in vacuum level was produced mainly by the slowing of the milk in the pipeline at the point of the riser.

While the vacuum in the milk line is fluctuating, the pulsator vacuum remains at the controlled level of 15 inches. This causes the teat cup liner to balloon as the vacuum level on the teat falls. If the vacuum drops too low, the cups will have a tendency to fall off during the collapse phase of the liners.

Effect of Diameter of Bore of the Rubber Liner Milk Tube on Vacuum Level Within the Teat Cup.—The diameter of the milk tube of the rubber liner affects the speed of flow of milk out of the cup as the liner presses in upon the milk. Graphs 6B and 6B' show the vacuum drops in the teat cup with each collapse of the liner when the milk tube diameter is 9 mm. and 7 mm., respectively. Notice that with the milk tube of small diameter the stylus was deflected to a greater extent. As the liner presses in upon the milk to force the milk through the tube, the smaller bore fills with milk to a greater extent and thereby causes the vacuum on the teat to fall to a lower level.

Fluctuating Vacuum on the Teat when the Milk Tube Is Pinched or Closed Prior to Removal of the Machine from the Teats.—Many milkers pinch the liner milk tube in an attempt to ascertain whether or not the endpoint of milking has been reached. Constriction of the milk tube, by pinching it as the liner is closing, causes the vacuum to drop and, if the constriction is maintained as the liner opens, the vacuum suddenly exceeds the level for which the system is controlled. This same phenomenon is observed when the milker attempts to remove the cups without stopping the action of the machine.

Some milkers break the flow of vacuum to the teats by bending the liner milk tubes at a sharp angle. As the liner collapses, the vacuum on the teat drops but, as the liner opens, the vacuum level may increase 4 to 5 inches above the controlled level of the system. This phenomenon is clearly shown in the last pulsation record at the far right of graph 6C. The vacuum on the teat dropped to 6 inches as the liner closed and increased to 20 inches as the liner opened.

Vacuum may extend into the teat cavity at the endpoint of milking. With a greater vacuum inside than outside the teat as the liner collapses, it is conjectured that if milk is trapped in the teat cup, the pumping action of the liner may force milk back into the teat cavity. If such an occurrence is possible, then the manner of removal of the milking machine is of considerable importance in mastitis prevention and control.

CONCLUSION AND SUMMARY

The milking machine has two vacuum systems, namely the milking vacuum and the pulsator vacuum. The milking vacuum intensifies the positive pressure on the milk in the teat cavity by causing the teat to balloon and the streak canal to dilate. The pulsator vacuum alternates with atmospheric pressure in the outer chamber of the teat cup, causing the rubber liner to open and close. Milk flows from the teat when the liner is open. The liner collapses when the pulsator directs air into the outer chamber. The purpose of the collapse is

twofold—to massage the teat and to force the milk out of the teat cup.

Mechanical milking involves the application of both negative and positive pressures to the teat. These pressures may place serious stresses upon the tissues and thereby intensify the mastitis problem. In order to study and measure these pressures in a critical manner, the Strain gage amplifier was adapted for use on the milking machine.

Graphs were obtained of the pulsation cycles of several makes and models of machines in use on dairy farms. The pulsator action graphs reveal significant differences not only between makes of machines but also between models of the same make. Some pulsators move the air rapidly, causing abrupt opening and closing of the liner, while others cause the liner to open quickly and close more slowly. Pulsators in use for some time show signs of wear, which seriously interferes with proper function and leads to increased stress upon the teats.

With master pulsation systems, it was observed that the pattern of pulsator action varies with the number of milking units in operation. A standard action of the teat cup is not possible with master pulsation when the number of machines being operated is constantly varied.

A study of liner design revealed that the magnitude of liner squeeze on the teat is greater with liners of large diameter. In addition, the diameter of the liner milk tube is of importance for, if milk is not removed rapidly from the teat cup as the liner collapses, a significant drop in vacuum level occurs and milking is slowed.

Pinching the liner milk tube to determine whether milk flow has ceased, or bending the milk tubes to break the vacuum while the machine is in operation, leads to a marked fluctuation of vacuum level on the teat. Under certain circumstances, with milk trapped in the teat cup while the pulsator is operating, it is conceivable that milk might be forced back into the teat cavity.

References

[1]Dodd, F. H., Oliver, J., and Neave, F. K.: The Effect of Design of Teat Cup Liners on Mastitis Incidence. J. Dai. Res., *24*, (1957): 20-26.

[2]Schalm, O. W., and Noorlander, D. O.: The Milking Machine Teat Cup in Relation to the Mastitis Problem. Southwest. Vet., *11*, (1958): 124-128.

[3]Schalm, O. W., Noorlander, D. O., and Pier, A. C.: Mechanical Milking and Mastitis. Proc. U. S. Livestock San. A. (1957): 187-196.

Effect of Vacuum and Pulsation Rate on the Rate of Machine Milking

Eighteen slow-milking cows, at Cornell University, were milked with a machine operated at various vacuum levels (10-15) and pulsation rates (20-80) for 27 days.

Increasing the vacuum level from 10.0 to 12.5 inches of mercury increased the speed of milking more than an increase from 12.5 to 15.0 inches. Increasing the pulsation rate, especially from 20 to 50 per minute, increased the speed of milking, but to a lesser extent than an increase in vacuum. Most of the effects of vacuum and pulsation increases, on increasing milking rate, were additive. The effect was greatest on the slowest milking cows.—*J. Dai. Sci. (June, 1958): 849.*

Allergic Dermatitis in a Dog

JEROME H. RIPPS, D.V.M.

Asbury Park, New Jersey

There is need for reports on established cases of allergic dermatosis in dogs. Since the specific causes can be innumerable, an impressive, valuable list could be compiled if the cases were accurately reported. An unusual case is reported here.

CASE REPORT

Since 1943, a male Dachshund had been treated each year, from April through August, until 1957, for an allergic dermatitis, the cause of which was unknown. It was characterized by redness and edema of the skin on the back and a papillary irritation and slight, serous exudate on the thoracic, axillary, and abdominal regions. Pruritus was always present.

The owner had observed that when the dog came into the house the odor of jasmine could be detected, indicating that it had been in contact with the bushes of Lonicera, a member of the honeysuckle family, which she had planted behind the garage. In this area, the jasmine blooms in late February and early March, and develops berries and heavy foliage in the late summer. These bushes were removed and the dog has had no dermatitis since.

Dr. Ripps is a small animal practitioner in Asbury Park, N. J.

Cleft Lip and Palate in the Dog

L. R. SETTY, Ph.D.

Washington, D. C.

Three Cocker Spaniel pups with the anomaly known as unilateral cleft lip accompanying unilateral cleft palate (fig. 1, 2) were born in a litter of 7, 4 of which

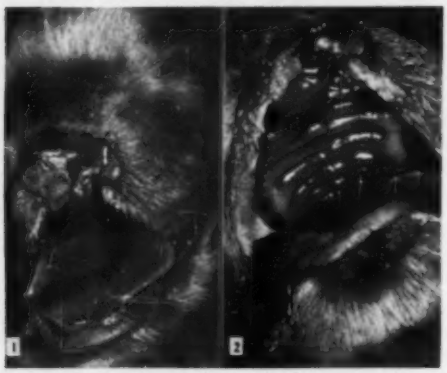


Fig. 1—Front view of the head of a pup with unilateral cleft lip and unilateral cleft palate.

Fig. 2—Front view of muzzle and hard palate of a pup with unilateral cleft lip and unilateral cleft palate.

were normal. The parents and grandparents of the pups were normal. One of the afflicted pups died at the age of 1 day; the other 2 died at the age of 1 week. All 3 pups were fed by hand.

Viewed from the front, it appeared that the cleft did not extend into the nasal opening (fig. 1). A large fold of soft tissue protruded from the medial side of the cleft and below the external nasal opening in such a way as to give the appearance that a wide area of tissue separated the cleft from the external nasal opening. However, when the mouth was opened and the hard palate examined (fig. 2), it was evident that the cleft was continued into the nostril and that the large fold of soft tissue tapered on its caudal end into one of the rugae of the roof of the mouth.

The skulls of the 2 pups that lived for one week were prepared by removing most of the soft tissues with a scalpel, then removing the remaining soft tissues by boiling the heads in a solution of sodium hydroxide.

From the Department of Anatomy, School of Medicine, Howard University, Washington, D. C.

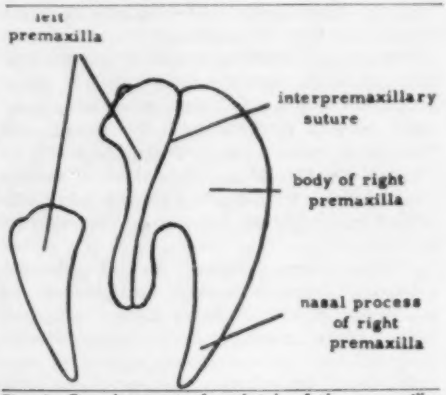


Fig. 3—Dorsal aspect of a sketch of the premaxillae from a pup with unilateral cleft lip and unilateral cleft palate.

The only bone especially affected was the left premaxilla (fig. 3, 4). The cleft occupied the middle third of this bone. The part along the midline of the hard palate and the part termed "nasal process" were

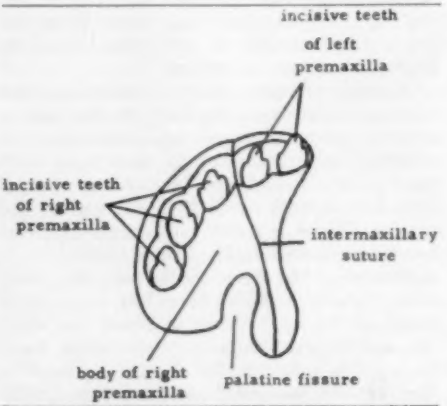


Fig. 4—Ventral aspect of the premaxillae from a pup with unilateral cleft lip and unilateral cleft palate.

present. Two incisor teeth were present in the former. The interpremaxillary suture was located to the right side of the median line, especially at the anterior margin.

It is of interest that the unilateral cleft lip in these pups was on the left side, the same side in which this anomaly usually occurs in man.

The Veterinarian and the Guide Dog

Guest Editorial

During a recent visit to the Seeing Eye establishment at Morristown, N.J., the writer had the opportunity to discuss a number of matters of mutual interest to veterinarians and the owners of guide dogs. It is evident that members of the Seeing Eye organization are acutely conscious of the opinions of veterinarians on all matters relating to the sanitary care and management of these dogs.

After a dog leaves the school with a blind person, its care becomes the responsibility of the new owner. Ownership is the best means of assuring good care of the dog, and for the blind person there appears to be definite therapeutic value in the pride of ownership. Modern rehabilitation concepts also indicate psychological value in the Seeing Eye's policy of asking each blind person to pay a small share of the cost of his dog. The owner will, in most instances, seek veterinary care of his dog whenever necessary; because the high value he places on the dog often takes on emotional overtones, he may even seek care when the need is doubtful.

To Charge or Not to Charge

The average person is sympathetic to the special problems of the blind person and admires those who seek the degree of independence afforded by a guide dog. But sympathy and admiration are not always consonant with understanding. In treating a guide dog, the veterinarian who refuses a fee for his services may do so with the best of intentions; but actions which are based upon higher motives are frequently susceptible to misinterpretation. The blind person who has the fortitude to seek his own living does not wish to be identified as an object for charity.

To refuse a reasonable fee from a client merely because he is blind may not only create a feeling of patronage, but in a number of instances has also deprived the dog of further attention, when the need may have been more critical, because the blind person resented unsolicited charity. This is a matter of considerable impact since without proper veterinary care a dog may not live out its expected useful life.

While practically every blind person must face the inevitability of replacement of his dog, premature loss would be an even more traumatic experience if the individual were to think he had been at fault in not seeking adequate attention. It redounds to the credit of the veterinary profession that no instances of excessive fees have been reported to the Seeing Eye organization.

A Health Program for Guide Dogs

While service without a fee may be indicated in some situations, there are broader aspects of the problem that deserve consideration. In the area of preventive medicine, a program that would extend the useful life of these dogs would be a tangible expression of the higher ideals of veterinary medicine. Such a program, established without selfish motive (beyond the satisfaction that comes from being of service), could become a powerful instrument of good public relations for the veterinary profession. Undoubtedly, this situation already exists in many communities, and good relationships with the blind client are the rule. However, the possibility should be kept in mind that a silent protest might deprive a dog of essential care.

While organizations like the Seeing Eye are private institutions, the general public has vested interest in the success of their programs. An appreciable number of blind persons are using a fourth or fifth dog. If, by adequate care, 3 dogs could do the work of 4 over a period of time, this would be the equivalent of increasing the supply of trained dogs by one third. Such a program would also have a distinct bearing on the tranquility and productivity of the blind individual.

Veterinarians might well take the initiative in establishing programs designed to extend the useful life of these dogs. Regular care at a nominal cost might prove less expensive to both parties than less frequent but more urgent attention. In addition to being the nucleus of a good public relations program in a community, the idea might lead to wider acceptance of the concept of preventive medicine by all animal owners.

—J. F. Smithcors, East Lansing, Mich.

Current Literature

ABSTRACTS

Genital Vibrio Infection in Sheep

In a herd of sheep, vibrios were isolated from vaginal mucus and from material taken at normal parturitions during a period of one and one half years after an outbreak of spontaneous vibrionic abortion. During this period there were no clinical signs of genital vibriosis.

The investigation showed that the vibrios isolated at the time of the abortions and those isolated during the period of one and one half years afterward belong to the same strain; however, the pathogenicity was lower in the vibrios isolated last.

The investigation showed that animals may carry vibrios long after abortions cease, even when there are no clinical signs of infection in the herd.—[*Gunnar W. Eide and Oddvar Helle: The Persistence of a Genital Vibrio Infection in a Herd of Sheep After an Outbreak of Vibrionic Abortion. Am. J. Vet. Res., 19, (Oct., 1958): 887-889.*]

FOREIGN ABSTRACTS

The County and Municipal Veterinary Hospitals of the U.S.S.R.

The county or municipal veterinary hospital is the main veterinary establishment of a district. It is responsible for the direction of prophylactic, therapeutic, and sanitary activities of all veterinary personnel in the veterinary detachments and stations and on the collective and state farms of the county. It maintains hospital service and consulting and ambulatory clinics to aid in the treatment of animals belonging to farms and individuals. It is responsible for the organization of regular and timely prophylactic and antiepizootic measures for the prevention and eradication of infectious and sporadic diseases of animals (including poultry, fish, and bees) in the county. To increase the productivity of animal husbandry, the county veterinary hospital introduces veterinary hygienic rules for the care and feeding of animals and enforces the observance of these rules. It also conducts the campaign against sterility and diseases of the young.

The hospital administers the antemortem and postmortem inspection of meat; investigates the sanitary condition of pastures, wells, drovers' routes, barns, and abattoirs; provides veterinary sanitary supervision for the holding, driving, transport, and slaughter of animals, for the storage, transport, and processing of animal products, and for the disposal of carcasses. It must determine the cause of death. The hospital is responsible for disinfection and rodent and insect control in buildings housing animals and animal products. Together with medical sanitary agencies, it is responsible for the control of zoonoses.

Its obligations include the determination of the economic loss caused by diseases of animals, the inspection of forage, and the veterinary education of the layman.

The hospital has the authority to relieve sick animals from work, to issue veterinary certificates, to stamp meat, and to issue instructions to the management of farms and industries for the establishment of quarantine and other measures to prevent and eradicate diseases of animals.

The director of the hospital is also the chief veterinarian of the county or city. He is appointed to and relieved from duty by the chief of the agricultural administration of the province or republic.

The hospital obtains veterinary supplies from the provincial office of the Veterinary Supply Trust and issues them to local veterinary establishments. Biological products and disinfectants are issued against special appropriations for the control of epizootics, while instruments and equipment are charged to the county or city budget.

An artificial insemination center and a model farriery are maintained at the hospital.—[*Anon.: On the County (Municipal) Veterinary Hospital. Veterinariya, 34, (Dec., 1957): 77-78.*]—ROBERT E. HABEL.

BOOKS AND REPORTS

Liver-Fluke Snails in Britain

This book, although written in semipopular style, is fundamentally scientific. The basic concepts and perspectives are handled well, but there is some repetition.

The author describes the life cycle and discusses the effect of the fluke on the host. Snails and their habitats are differentiated. The causes, whether man-made or natural, that produce suitable habitats for the snail and the various ramifications of control are discussed.

From the standpoint of a parasitologist, this reviewer would have preferred more information on the degree of grassiness of the areas in the immediate vicinities of the snail habitats, since it is related to the availability of cysts for hosts. Also, statistics on the percentage of the snails infected would have been interesting.—[*Liver-Fluke Snails in Britain. By Alan Mozley. 55 pages; illustrated. H. K. Lewis and Co., Ltd., 136 Gower St., London, England. 1957. Price about $1.30.*]—WENDELL KRULL.

Congress of the German Veterinary Medical Association

The Second Congress of the German Veterinary Medical Association was held in Bad Nauheim. Papers on the biochemistry of reproduction, heredity and fertility, listeriosis of cattle, and the epidemiology of rabies were presented.—[*Proceedings of the Second Congress of the German Veterinary Medical Association, April, 1957 (Bericht des 2. Kongresses der Deutschen Veterinarmedizinischen Gesellschaft). 107 pages; 5 illustrations. Paul Parey, Berlin, Germany. 1958. Price $4.50.*]—F. KRAL.

THE NEWS

Soviet Agricultural Exchange Delegation on Veterinary Science Visits the AVMA Offices

Six specialists on veterinary science who arrived in Washington from Moscow on Sept. 2, 1958, toured the AVMA offices at 600 S. Michigan, Chicago, on September 12, after spending a week in discussion with United States' officials and specialists in Washington and two days in Michigan.

This is the fifth reciprocal Russian agricultural technical delegation to come to the U.S. in accordance with an agreement, announced last January, between the two nations for a general program of exchanges in cultural, technical, and educational fields.

As part of their month's planned visit to Land Grant Colleges and to other points of interest in the Midwest, the delegation conferred with staff members of the Association to familiarize themselves with the national veterinary organization and its relation with private veterinarians, with schools and colleges of veterinary medicine, and with the state and federal veterinary services here.

Members of the delegation included: Dr. A. A. Boiko, member, Ministry Agriculture Collegium; G. A. Osipenko, vice-chief, All-Union Trust for Biological Industry; L. L. Verteletskiy, chief, veterinary administration; A. Y. Dzerzhinskiy, director, Kazakh Veterinary Research Institute; S. R. Didovets, chief, Ukrainian Veterinary Administration; Y. R. Kovalenko, director, All-Union Experimental Veterinary Institute; Mr. Vorisenko, translator; Dr. Don Miller, ARS, U.S.D.A.; A. B. Tatischeff, State Department representative.

The Russian delegation left for Iowa State College, Ames, on September 13, with subsequent visits to the University of Nebraska, the University of Georgia, and Cornell University among the other stopovers on their agenda. The group left New York, October 4, for Russia.

The corresponding United States' veterinary science delegation visited Russia in July of this year (*see* the JOURNAL, July 1, 1958, p. 88).

The AVMA was host to the Russian veterinary delegation and to the representatives of the United States' livestock and medical organizations at the Conrad Hilton Hotel, in Chicago, on September 12.

Seated (left to right)—Herman Aaberg, American Farm Bureau Federation; Aleksandr Y. Dzerzhinskiy, director, Kazakh Veterinary Research Institute; P. O. Wilson, National Livestock Producers; Grigoriy A. Osipenko, vice-chief, All-Union Trust for Biological Industry; A. P. Davies, American Meat Institute; Arkadiy A. Boiko, member of the Ministry of Agriculture Collegium; Dr. J. G. Hardenbergh, general consultant to the AVMA; Carl Neuman, National Livestock and Meat Board; Yakov R. Kovalenko, director, All-Union Experimental Veterinary Institute; Leonid L. Verteletskiy, chief, Veterinary Administration.

Standing (left to right)—Mr. R. G. Rongren, business manager, AVMA; Tom Hendricks, A.M.A.; Dr. W. A. Aitken, editor-in-chief, JOURNAL of the AVMA; Dr. D. A. Price, associate-editor, JOURNAL of the AVMA; Sergei R. Didovets, chief, Ukrainian Veterinary Administration; Dr. H. E. Kingman, Jr., executive secretary, AVMA; A. B. Tatistcheff, interpreter and tour director assigned by the U.S. Department of State; Dr. Donald Miller, ARS, U.S.D.A.; A. Borisenko, veterinary specialist with the U.S.D.A.; Mr. Brian M. Forster, director of public information, AVMA.

Russian veterinary specialists are pictured behind the desk of the editor-in-chief, Dr. W. A. Aitken, examining copies of the "American Journal of Veterinary Research" and the JOURNAL of the AVMA, currently produced by the Association on a quarterly and semimonthly basis, respectively. (Left to right)—Aleksandr Y. Dzerzhinskiy, director, Kazakh Veterinary Research Institute; Leonid L. Verteletskiy, chief, Veterinary Administration; Yakov R. Kovalenko, director, All-Union Experimental Veterinary Institute; Dr. Donald Miller, ARS, U.S.D.A.; Arkadiy A. Boiko, member of the Ministry of Agriculture Collegium; Dr. W. A. Aitken, editor-in-chief, JOURNAL of the AVMA; Sergei R. Didovets, chief, Ukrainian Veterinary Administration; Dr. D. A. Price, associate-editor, JOURNAL of the AVMA; Grigoriy A. Osipenko, vice-chief, All-Union Trust for Biological Industry; and A. Borisenko, U.S.D.A., veterinary specialist and interpreter.

U.S.D.A. Plans Extensive Recruitment Program in Meat and Poultry Inspection Activities

The Agricultural Research Service of the U.S.D.A. has an urgent need for over 150 veterinarians in its Meat Inspection Division at different locations throughout the country.

These vacancies will be filled at the GS-7 and the GS-9 grade levels, depending upon the qualifications of the applicants. Current entrance salaries for veterinarians at these grade levels are $5,430 and $6,135 per annum, respectively.

Veterinarians with less than one year of professional experience will be appointed in grade GS-7 at the salary rate of $5,430 per year. Those with one year or more of professional veterinary experience will be appointed in grade GS-9 with a salary rate of $6,135 per annum. The U.S.D.A. further announced that there are excellent opportunities for advancement from grade GS-7 to grade GS-9 upon the satisfactory completion of six months' service and training in the ARS.

Poultry Inspection Activities

Although the U.S.D.A. has had a poultry inspection service for 31 years, the department is

Members of the Russian veterinary profession are pictured with members of an American veterinary delegation in Moscow on July 28, 1958.

Dr. Rue Jensen (1); Prof. A. P. Zotov (2); correspondent, name unknown (3); Dr. J. J. Callis (4); interpreter, name unknown (5); Prof. Z. R. Kovalenko (6); Prof. P. L. Voloskof (7); Dr. V. E. Schurevski (8); Prof. A. A. Kudrievsev (9); Prof. V. N. Schuren (10); Dr. C. D. Van Houweling (11); Dr. W. A. Hagan (12); Prof. R. R. Markov (13); Dr. A. G. Frank (14).

planning considerably more than just a normal expansion for next January.

The poultry inspection branch must recruit, train, and be ready to staff all the plants which will need the new compulsory inspection service beginning Jan. 1, 1959. They plan to use graduate veterinarians as much as possible to direct and supervise antemortem and postmortem examinations and to generally supervise plant sanitation and operation.

Department officials estimate they will need approximately twice as many trained men as they now have. A recent survey of all plants that will need inspection service this January indicates that if the U.S.D.A. continues its present policies on the limited use of lay personnel, they will require about 265 more veterinarians.

Approximately 850 to 900 poultry plants will be operating under inspection in this new service policy which the department calculates will require 1,100 to 1,200 veterinarians and lay inspectors to do the job.

For Additional Information

Any veterinarians interested in obtaining federal employment in the Meat Inspection Division are encouraged to contact the Personnel Division of the ARS, U.S.D.A., Washington 25, D. C.; or the nearest federal veterinarian in charge of meat inspection or of livestock disease control and eradication activities.

Those veterinarians interested in ascertaining employment opportunities in the poultry inspection service may write to the Personnel Division of the Agricultural Marketing Service, U.S.D.A., Washington 25, D. C.

AMONG THE STATES AND PROVINCES

Colorado

Dr. O. R. Adams Returns from Africa.—Dr. Ora R. Adams (COL '46), College of Veterinary Medicine at Colorado State University, returned to Fort Collins on July 1, 1958, after a year's leave of absence spent at Makerere College in Kenya, East Africa.

On a Fullbright Scholarship, Dr. Adams studied the diseases of the East African Animals and served as an advisor on construction of a new large animal clinic which was completed and in use during the last two months of his stay. He also taught several courses and did clinical work with animals for the English farmers of the "White Highlands" region and for the farmers of the Kikuyu Reserve.—*Rocky Mountain Veterinarian (July, 1958):16.*

District of Columbia

Dr. L. J. Rafoth Named Chief Staff Officer for Animal Foods.—Dr. A. R. Miller, director, U.S.D.A.'s Meat Inspection Division, announced recently that Dr. Leslie J. Rafoth (ISC '43), has been named chief staff officer for animal foods in Washington, D. C. He succeeds Dr. D. W. Glascock who was transferred to the Chicago station as inspector in charge.

Dr. Leslie J. Rafoth

Dr. Rafoth assumed his new duties on July 27, 1958. He went to Washington from the Chicago station where he had served as assistant inspector in charge. Dr. Rafoth has also been engaged in meat inspection work at Dubuque, Iowa, and in Green Bay, Wis.

Illinois

Central Illinois Association.—The quarterly meeting of the Central Veterinary Medical Association was held Sept. 10, 1958, at the St. Nicholas Hotel in Springfield.

Dr. Donald E. Moore, Decorah, Iowa, discussed "Diseases of Swine."

s/PAUL B. DOBY, *Secretary-Treasurer.*

• • •

Chicago Association.—The regular monthly meeting of the Chicago V.M.A. was held in the Press Gallery of the LaSalle Hotel on Sept. 9, 1958.

Mr. Bernard Hirsh, a member of the American Medical Association legal staff, presented a discussion on "The Legal Responsibilities of the Professional Man."

Since there has been some discussion of the possibility of a revision of the Illinois Veterinary Practice Act, the executive board of the Chicago V.M.A. is interested in receiving the

opinions and ideas of its members in regard to the various ingredients of this new practice act. All correspondence on the subject should be addressed to Dr. John M. Gillespie, 7560 Central Ave., River Forest.

s/CHARLES ARMSTRONG, *Secretary.*

Iowa

A New Slant to An "Old" Horse.—Drs. D. R. Bromwell and O. W. Whitcomb, both of Center Point, Iowa, were featured recently in *The Cedar Rapids Gazette* for their activities in revitalizing and racing several old horses which they had acquired when the horses were considered unfit for racing due to lameness or some other ailment.

Drs. Bromwell and Whitcomb made a project of treating the ailing animals and, as a result, succeeded in extending the racing careers of several of these horses.

s/GRANT B. MUNGER, *Correspondent.*

Kansas

Dr. J. H. Richardson Assigned to State Health Department.—A native of Georgia, Dr. J. H. Richardson (GA '54), Topeka, has recently been assigned to the Kansas State Health Department by the Public Health Service. He had previously been with the state health department of Delaware in a similar capacity.

Responsible for developing a veterinary public health program in Kansas, Dr. Richardson is primarily concerned with the problems relating to animal diseases communicable to man.

s/FRED B. OGILVIE, *Correspondent.*

Kentucky

Dr. Proctor Buys Farm.—Dr. Delano L. Proctor, Jr. (COR '42), Lexington, recently purchased the 60-acre Hillandale Farm of J. R. Queen, also of Lexington. He hopes to transfer his operations there from his Fair Trial Farm early in 1959.

Dr. Proctor said his farm, Fair Trial, would be leased and, until arrangements have been made, he will continue to maintain the clinic which was built there several years ago by Crown Crest Farm.

Improvements at Hillandale include a residence and 40 stalls.—*Blood-Horse, 76, (Aug. 30, 1958): 556.*

Massachusetts

State Association.—Approximately 100 members of the Massachusetts Veterinary Association attended the fall meeting, Sept. 10, 1958, at "Motel 128" in Dedham, Mass.

Dr. C. Lawrence Blakely, Needham, president of the association and director of surgery at the Angell Memorial Animal Hospital, presided at the day-long meeting.

The revision of the association's bylaws, the first bylaw change in 70 years, was adopted at the business session of the meeting. Plans for celebrating the association's seventy-fifth anniversary in 1959 also were announced.

"Veterinary Medical Practice Management" was the subject of the practitioners' panel in which Dr. Charles Streeter, Shelburne Falls, Dr. Winthrop Brielman, Pittsfield, and Dr. George Abbott, Worcester, participated. Dr. E. C. Bulger, North Andover, and Dr. Allan Vogel, Northampton, acted as moderators.

After dinner, association members listened to a discussion of "Medical Practice Management" presented by Mr. Walter Hughes, administrator of the John Lambert Medical Associates of Lowell, Massachusetts.

s/L. T. MALONEY, *Consultant.*

Missouri

Dr. M. R. Fisher Cited at Sanitarians' Convention.—Signal honors for long service to the International Association of Milk and Food Sanitarians at the forty-fifth annual meeting of the group at the Hotel New Yorker, New York City, on Sept. 10, 1958, went to Dr. Milton R. Fisher (OSU '25), of St. Louis, Mo.

Dr. Fisher, chief of the milk control section of the St. Louis health division, was presented with the Citation Award, bestowed annually to a member of the association whose contributions over a period of years have helped to further its professional advancement, strengthened its growth, and enhanced its reputation.

Dr. Fisher is a past-president of both the International Association of Milk and Food Sanitarians and its affiliate, the Missouri Association of Milk and Food Sanitarians. He was a major architect of the present organizational structure as a member of its executive board, and he currently serves on its committee of sanitary procedures, which presents the viewpoint of sanitarians in formulating 3-A sanitary standards for dairy equipment.

• • •

Greater St. Louis Association.—An installation dinner for the new officers of the association was held in the Chrystal Room of the Coronado Hotel in St. Louis.

Dr. Allen B. Shopmaker, retiring president, inaugurated the following officers for the ensuing year: Drs. Charles Ruck, East St. Louis, Ill., president; Chester R. Plegge, St. Louis, vice-president; Edwin E. Epstein, St. Louis, secretary; and James R. Seelbach, University City, Mo., treasurer.

Included in the program was an address by Mr. Gary Cunard of the Addressograph-Mimeograph Company, who discussed the danger

of weakening our national defense program by stressing military power and providing insufficiently for education.

Dr. G. R. Killian, Webster Groves, Mo., was selected to act as delegate to the election committee of the Missouri V.M.A. with Dr. J. Evans, St. Charles, Mo., as alternate.

s/EDWIN E. EPSTEIN, *Secretary.*

New York

Dr. Charles P. Gandal, New Veterinarian at the New York Zoological Park.—The appointment of Dr. Charles P. Gandal (COR '51), as veterinarian of the New York Zoological Park, was announced recently by the New York Zoological Society.

Dr. Gandal was in general practice in Red Bank, N. J., for six months and became assistant veterinarian at the Zoological Park (Bronx Zoo) at the beginning of 1952. He was made associate veterinarian in 1956, and veterinarian earlier this year when Dr. Leonard J. Goss resigned to become director of the Cleveland Zoo.

Texas

Wife of College Head Dies.—Mrs. Lucille O. Lewis Evans, 54, wife of Dr. E. B. Evans, president of Prairie View State College, died in August, 1958, after suffering a heart attack.

Mrs. Evans was a native of Gonzales. She had resided in Prairie View for 35 years.

Beside her husband, Mrs. Evans is survived by a son, a daughter, a brother, and three grandchildren.

s/J. GILBERT HORNING, *Correspondent.*

U.S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A. are reported as of Sept. 2, 3, 4, & 11, 1958.

TRANSFERS

Charles E. Bardshar, from St. Cloud, Minn., to Whitehall, Wis.
Sheldon Z. Keevak, from St. Louis, Mo., to Kinston, N. Car.
Stephan B. Kurylas, from Baltimore, Md., to Canton, Ohio.
Howard Levin, from Baltimore, Md., to New York, N. Y.
George J. B. Murray, from Omaha, Neb., to Baltimore, Md.
Klaus H. Schwabe, from Green Bay, Wis., to Knoxville, Tenn.
Daniel F. Werring, from Lincoln Neb., to St. Paul, Minn.

RETIREMENTS

Homer E. Benge, Jersey City, N. J.
Charles W. Brown, Des Moines, Iowa.
George L. Fallon, Baltimore, Md.

STATE BOARD EXAMINATIONS

Interested persons can obtain information about applications, fees, deadlines for filing applications, and exact time and place of examinations of the respective boards by writing to the persons whose names and addresses are given below.

NEW YORK—Next written examination will be held Dec. 2-5, 1958, at New York, Albany, Syracuse, and Buffalo; the practical examination will be given on Nov. 14, 1958, at Ithaca. James O. Hoyle, 23 South Pearl St., Albany 7, secretary, State Board of Veterinary Medical Examiners.

TEXAS—Next licensing examinations will be held Jan. 14-16, 1959; Austin. The completed application must be received in the board office not later than 30 days before the examination date. Mr. T. D. Weaver, 207 Capital National Bank Building, Austin 16, executive secretary, State Board of Veterinary Medical Examiners.

DEATHS

Star indicates member of AVMA

Charles H. Beere (CHI '06), Cheshire, Conn., died Aug. 12, 1958, in a Waterbury, Conn., hospital, after a short illness.

A native of Connecticut, Dr. Beere was a 32nd degree Mason, a member of the Lafayette Consistory of Bridgeport, and the Harmony Lodge in Waterbury.

Surviving Dr. Beere are his widow, Mrs. Lulu Pierpont Beere, and two granddaughters.

Hugh D. Laird (COR '11), 69, Henderson, N. Y., died at his home on Aug. 24, 1958.

Dr. Laird had been county veterinarian in Oswego and at Washington before moving to Henderson 20 years ago and entering into private practice.

Surviving Dr. Laird are a daughter, a son, a sister, and eight grandchildren.

Harvey J. Lawrence (KVC '09), 78, Sioux City, Iowa, died in a hospital, after a long illness, on July 20, 1958.

Dr. Lawrence was employed by the Department of Agriculture for 42 years as a meat inspector in the Sioux City stockyards. He was honored by the secretary of agriculture, Clinton P. Anderson, at a dinner marking his fortieth year of service to the department.

His widow, a son, a daughter, and a brother survive Dr. Lawrence.

Joe F. Lester (WSC '17), 68, Wenatchee, Wash., Wenatchee postmaster and a former state legislator, died in a local hospital on Aug. 26, 1958, following a sudden illness.

Born in Odebolt, Iowa, Dr. Lester came to

Wenatchee in 1919, where he practiced prior to purchasing the Lester Dairy in 1923. In 1949, he was elected to the state legislature and served for three sessions before his appointment as postmaster in April, 1954. He was also president of the Wenatchee Kiwanis Club and active in many local affairs.

Dr. Lester is survived by his widow, Mary Rowe Lester, three sons, one daughter, two sisters, and six grandchildren.

A. McDaniel (SF '06), 89, Gridley, Calif., a practicing veterinarian there for 56 years, died in a Sacramento hospital on Aug. 4, 1958.

A native of Jackson County, Iowa, Dr. McDaniel had served in California as county veterinarian for a number of years and also as state meat inspector.

Dr. McDaniel is survived by his wife, Nora E. Fleming McDaniel, two daughters, and three sons.

Hubert A. Nowlin (API '34), 50, Pensacola, Fla., died at a Pensacola hospital where he had been a patient for five days prior to his death on Aug. 3, 1958.

Born in Indiana, Dr. Nowlin had lived in Florida for the past 39 years. Upon graduation, he was employed by the Florida Livestock Board and then by the Bureau of Animal Industry, U.S.D.A. He had entered private practice in Pensacola in 1937.

Dr. Nowlin was a member of the Florida S.V.M.A., the Northwest Florida Veterinary Medical Society, and the Gonzalez Methodist Church.

Surviving him are two sons, his parents, two sisters, and two brothers; one of whom is also a veterinarian, Charles L. (API '43), of Panama City, Fla.

Lewis F. Reed (COR '13), 70, Remsen, N. Y., died Aug. 24, 1958, after a short illness.

Dr. Reed was a member of the Remsen Masonic Lodge 677 of Barneveld, and of the Ziyara Temple of Utica, as well as a member of the Central New York Veterinary Association.

Surviving Dr. Reed are his widow, Kathleen Mahaffy Reed, and a daughter.

Garrett W. Riley (UP '12), 68, Fargo, N. Dak. died Aug. 24, 1958, in a Minneapolis Hospital. He had been visiting in Alexandria, Minn., when he became ill and had been hospitalized for five days before his death.

After 32 years in the government service, Dr. Riley went to Fargo in 1949 to manage the Fort Dodge Laboratories, Inc. He had retired in October, 1957.

Dr. Riley is survived by his wife, three daughters, and a son, who is also a veterinarian, Charles W. (KSC '44) of Alexandria, Minn.

James W. Robinson (CVC '12), 65, Portsmouth, Ohio, died at Smith-Everett Hospital, where he had been a patient for a week prior to his death on Aug. 21, 1958.

Born in Yonkers, N. Y., Dr. Robinson came to Portsmouth from Georgetown, Ohio, where he had served as mayor. He had also taught at the University of Cincinnati before making his home in Portsmouth. For 15 years, Dr. Robinson served as an inspector for the city board of health.

He is survived by his widow, Pauline, a daughter, a brother, and one grandchild.

H. Stanley Stoker (UP '03), 85, Stillwater, Pa., died Aug. 22, 1958, at a Bloomsburg, Pa., hospital.

Upon graduation, Dr. Stoker participated in the first tuberculosis testing in the county that year and in 1914-1915, he assisted in the eradication of hoof-and-mouth disease. In 1953, Dr. Stoker was honored by his fellow alumni of the University of Pennsylvania for 50 years of service to the veterinary profession.

He is survived by his widow, the former Nellie Selph, one daughter, and two sons.

Frank C. Sims (KVC '10), 70, Aurora, Neb., a native of the Aurora farm community and a veterinarian there since 1914, died in an Aurora hospital on Aug. 26, 1958.

Surviving Dr. Sims are his widow, Ruth E. Allen Sims, a daughter, a brother, and a sister.

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Other Deaths Reported.—The following deaths have been reported. The usual information for an obituary was not supplied.

Emery J. Bess (KVC '15), 73, Fillmore, Ill., died Aug. 20, 1958.

George Caldwell (formerly of Twin Falls, Idaho) Santa Monica, Calif., died in August, 1958.

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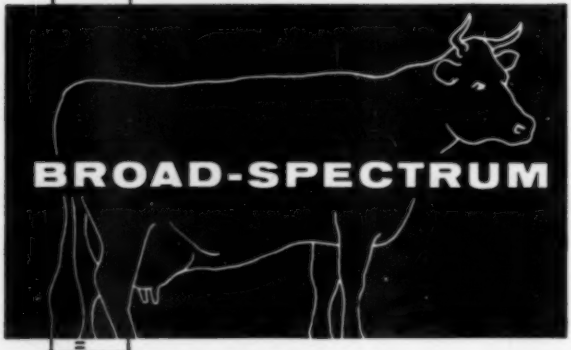

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District IV (Kentucky, Michigan, Ohio, and West Virginia)—Wade O. Brinker, College of Veterinary Medicine, Michigan State University, East Lansing, Mich. (1959).

District V (Illinois, Indiana, and Wisconsin)—E. A. Woelffer, 115 Woodland Lane, Oconomowoc, Wis. (1963).

District VI (Iowa and Minnesota)—F. B. Young, Box 6, Waukee, Iowa (1960).

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District XI (Idaho, Montana, Oregon, and Washington)—E. C. Stone, College of Veterinary Medicine, State College of Washington, Pullman, Wash. (1960).

District XII (Provinces of Canada)—J. A. Henderson, Ontario Veterinary College, Guelph, Ont. (1962).

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REFERENCES: 1. Bull, W. S.: N. Amer. Vet., In press. 2. Henry, R. T., and Blackburn, E. G.: Vet. Med., In press.

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J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill.
T. Lloyd Jones, Ontario Veterinary College, Guelph, Ont.
Wayne O. Kester, 11502 W. Colfax Ave., Denver, Colo.
H. E. Kingman, Jr., 600 S. Michigan Ave., Chicago 5, Ill.
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C. W. Bower, *Chairman,* 1128 Kansas Ave., Topeka, Kan. (1961).
F. R. Booth, 3920 E. Jackson Blvd., Elkhart, Ind. (1960).
W. G. Brock, 1360 N. Buckner Blvd., Dallas 18, Texas (1959).
W. O. Kester, 11502 W. Colfax Ave., Denver, Colo. (1962).
Raymond C. Snyder, Walnut St. and Copley Rd., Upper Darby, Pa. (1963).

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Council on Education

J. E. Greene, *Chairman, Representing Clinical Sciences,* School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala. (1962).

T. Lloyd Jones, *Secretary, Representing Basic Sciences,* Ontario Veterinary College, Guelph, Ont. (1960).

L. M. Hutchings, *Representing Veterinary Research,* School of Veterinary Science and Medicine, Purdue University, Lafayette, Ind. (1962).

W. E. Jennings, *Representing Military Service,* Office of the Surgeon, Hq. Fifth Army, 1660 E. Hyde Park Blvd., Chicago 15, Ill. (1959).

H. L. Marsh, *Representing Large Animal Practice,* 521 Billings St., Princeton, Ill. (1961).

S. H. McNutt, *Representing Postgraduate Education,* Veterinary Science Department, University of Wisconsin, Madison, Wis. (1960).

C. K. Mingle, *Representing Regulatory Veterinary Medicine,* 4512 Oliver St., Riverdale, Md. (1959).

F. B. Ogilvie, *Representing Small Animal Practice,* 1110-12 Minnesota Ave., Kansas City 2, Kan. (1963).

Niel W. Pieper, *Representing Mixed Practice,* Randolph Rd., Middletown, Conn. (1963).

H. J. Stafseth, *Representing Public Health (including milk and meat inspection),* College of Veterinary Medicine, Michigan State University, East Lansing, Mich. (1961).

Council on Research

Carl A. Brandly, College of Veterinary Medicine, University of Illinois, Urbana, Ill. (1962).

C. H. Cunningham, *Secretary,* College of Veterinary Medicine, Michigan State University, East Lansing, Mich. (1959).

L. C. Ferguson, College of Veterinary Medicine, Michigan State University, East Lansing, Mich. (1961).

Robert Getty, *Chairman,* Division of Veterinary Medicine, Iowa State College, Ames, Iowa (1961).

W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, N.Y. (1963).

Rue Jensen, College of Veterinary Medicine, Colorado State University, Fort Collins, Colo. (1962).

T. Carl Jones, Angell Memorial Animal Hospital, 180 Longwood Ave., Boston, Mass. (1959).

Hadleigh Marsh, 916 S. 3rd Ave., Bozeman, Mont. (1960).

R. D. Turk, School of Veterinary Medicine, Texas A. & M. College, College Station, Texas (1963).

J. D. Wheat, School of Veterinary Medicine, University of California, Davis, Calif. (1960).

Council on Veterinary Service

R. O. Anderson, 223 N. Wisconsin St., Elkhorn, Wis. (1960).

C. A. Bjork, 3644 N. E. Flanders St., Portland, Ore. (1962).

F. R. Candlin, 280 Madison St., Denver 6, Colo. (1961).

A. H. Groth, School of Veterinary Medicine, University of Missouri, Columbia, Mo. (1960).

J. O. Knowles, 2101 N. W. 25th Ave., Miami 42, Fla. (1963).

P. E. Madsen, 336 N. Jefferson St., Sheridan, Wyo. (1959).

J. L. McAuliff, 11 Jewett Ave., Cortland, N.Y. (1963).

A. G. Misener, 6448 N. Clark St., Chicago, Ill. (1962).

V. D. Stauffer, 5500 Wadsworth Blvd., Arvada, Colo. (1961).

Kenneth Whittington, 769 Vance Ave., Memphis, Tenn. (1959).

Council on Biological and Therapeutic Agents

R. J. Anderson, Animal Disease Eradication Division, ARS, U.S.D.A., Washington 25, D.C. (1961).

Chas. E. Bild, P.O. Box 127, North West Sta. Br., Miami 47, Fla. (1962).

Clyde Cairy, 3917 Gainesborough Dr., East Lansing, Mich. (1959).

John M. Collins, Veterinary Medical Branch, Food and Drug Administration, Department of Health, Education, and Welfare, Washington, D.C. (1961).

K. Maynard Curts, *Secretary,* 5236 Delmar St., Kansas City 3, Kan. (1960).

L. Meyer Jones, *Chairman,* Division of Veterinary Medicine, Iowa State College, Ames, Iowa (1963).

Roger P. Link, College of Veterinary Medicine, University of Illinois, Urbana, Ill. (1960).

Carl J. Norden, Jr., Norden Laboratories, Lincoln, Neb. (1963).

J. D. Ray, 208 W. Franklin St., White Hall, Ill. (1962).

James Saunders, Jr., 755 N. E. Military Hwy., San Antonio, Texas (1959).

Council on Public Health and Regulatory Veterinary Medicine

R. K. Anderson, College of Veterinary Medicine, University of Minnesota, St. Paul, Minn. (1960).

John Cunkelman, Veterinary Division, Research Department, Swift and Company, Chicago, Ill. (1959).

H. G. Geyer, Division of Animal Industry, State Office Bldg., 65 S. Front St., Columbus 15, Ohio (1961).

James R. Hay, 274 S. Broadleigh Rd., Columbus 9, Ohio (1961).

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S. L. Hendricks, Iowa State Department of Health, Des Moines, Iowa (1960).

Oscar Sussman, 42 Clover Lane, Princeton, N.J. (1962).

E. S. Tierkel, Communicable Disease Center, U.S.P.H.S., 50 7th St., N.E., Atlanta 5, Ga. (1962).

C. D. Van Houweling, ARS, U.S.D.A., Washington 25, D.C. (1963).

Asa Winter, Animal Disease Eradication Div., ARS, U.S.D.A., Lewis Cass Bldg., 6th floor, Lansing 13, Mich. (1959).

Elmer W. Young, Veterinary Division, Office of the Surgeon General, Department of the Army, Washington 25, D.C. (1963).

National Board of Veterinary Medical Examiners Meet in Philadelphia

The annual meeting of the National Board of Veterinary Medical Examiners was held at the Sheraton Hotel, Philadelphia, on Monday afternoon, Aug. 18, 1958, president W. T. S. Thorp presiding. Seventeen of the 31 members of the Board were present or represented by proxies. Several state veterinary examining boards were also represented.

Dr. Lillian D. Long, director of Professional Examination Service, New York City, presented and discussed "A Report on the Veterinary Medicine Licensing Examination of the National Board of Veterinary Medical Examiners." This comprehensive report included a review of the various forms of examinations since 1954, the number of licensing boards using them, and the number of candidates examined. The figures follow:

	No. of Boards	No. of Candidates
1954	3	210
1955	8	501
1956	11	588
1957	15	684
1958	20	899

Dr. Long also discussed the possible establishment of an "interstate reporting service" to provide a means whereby candidates would not have to repeat the written tests (multiple-choice questions) in a second state after having taken it previously in another state using the National Board-P. E. S. examinations. If such a service were available, the examining board in the second state would obtain the previous test scores of candidates through the reporting service and devote their time to the oral and practical tests needed to complete examinations for licensure.

Those present were unanimously in favor of having the basis for such a system developed for later presentation and consideration.

The term of Dr. W. T. S. Thorp having expired and he not being eligible for another succeeding term, Dr. C. W. Bower was elected to a three-year term as one of the members of the National Board elected by its membership.

Dr. C. W. Bower was elected as president of the Board for the ensuing year and Dr. J. G. Hardenbergh as secretary. The following were elected as members of the executive committee: Drs. A. E. Coombs, J. O. Knowles, P. C. Olson, R. E. Rebrassier, and J. H. Steele.—*J. G. Hardenbergh, secretary.*

APPLICATIONS

Applicants Not Members of Constituent Associations

In accordance with paragraph (c) of Section 1, Article 1, of the Bylaws, the names of applicants who are not members of constituent associations shall be published in the JOURNAL. Written comments received by the Executive Secretary from any active member regarding the application as published, will be furnished to the Judicial Council for its consideration prior to acceptance of the application.

GROSS, M. ADRIAN
323 A Hickory Lane, East Lansing, Mich.
D.V.M., Ontario Veterinary College, 1954.
Vouchers: W. W. Armistead and C. H. Cunningham.

MORRIS, JOHN H.
Fort Detrick, Frederick, Md.
D.V.M., Michigan State College, 1943.
Vouchers: L. C. Murphy and M. W. Castleberry.

RIVAS, ERNESTO
P. O. Box 2006, Lima, Peru.
D.V.M., San Marcos University, 1951.
Vouchers: D. R. Cordy and H. J. Ruiz.

Norden Laboratories' Advertisement Correction

The identification, Kadoma's Lady Beau, A.K.C., was inadvertently omitted as the name of the dog in the Norden Laboratories' Neosulfone ad, published on page 1 in the Sept. 15, 1958, issue.

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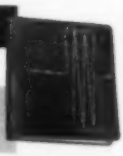
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COMING MEETINGS

United States Livestock Sanitary Association. Sixty-second annual meeting. Hotel Deauville, Miami Beach, Fla., Nov. 4-7, 1958. R. A. Hendershott, secretary-treasurer.

Mississippi Valley Veterinary Medical Association. Annual meeting. Pere Marquette Hotel, Peoria, Ill., Nov. 5-6, 1958. W. P. Hendren, Carthage, Ill., secretary-treasurer.

Midwest Small Animal Association and the A.A.H.A. Regional meeting. Hotel Burlington, Burlington, Iowa, Nov. 12-13, 1958. J. Porter Coble, 2828 S. MacArthur Blvd., Springfield, Ill., secretary.

American Society of Animal Production. Fiftieth anniversary meeting. Sherman Hotel, Chicago, Ill., Nov. 28-29, 1958. Dr. H. H. Stonaker, Colorado State University, Fort Collins, secretary-treasurer.

Nebraska State Veterinary Medical Association. Annual meeting. Hotel Cornhusker, Lincoln, Dec. 3-5, 1958. W. T. Spencer, 1250 North 37th, Lincoln, Neb., secretary-treasurer.

Arizona Veterinary Medical Association. Annual meeting. Yuma Country Club, Yuma, Dec. 7-9, 1958. Robert E. McComb, Jr., Phoenix, program chairman; Thomas E. Lightle, Route 1, Box 817, Yuma, in charge of reservations.

Kentucky Veterinary Medical Association. Winter meeting. Irvin S. Cobb Hotel, Paducah, Ky., Dec. 8-9, 1958. L. S. Shirrell, 545 E. Main St., Frankfort, Ky., secretary-treasurer.

American Association of Equine Practitioners. Annual meeting. LaSalle Hotel, Chicago, Ill., Dec. 15-16, 1958. M. L. Scott, 42 W. Market St., Akron 2, Ohio, secretary-treasurer.

Southern California Veterinary Medical Association. Annual meeting. Beverly Hilton Hotel, Beverly Hills, Jan. 10, 1959. R. J. Schroeder, 1919 Wilshire Blvd., Los Angeles, Calif., program chairman.

Tennessee Veterinary Medical Association. Annual meeting. Noel Hotel, Nashville, Jan. 11-13, 1959. H. W. Hayes, 5009 Clinton Pike, Knoxville, secretary-treasurer.

Indiana Veterinary Medical Association. Annual meeting. Hotel Severin. Indianapolis, Ind., Jan. 14-16, 1959. George R. Burch, program chairman.

Iowa Veterinary Medical Association. Annual meeting. Hotel Fort Des Moines, Iowa, Jan. 20-22, 1959. F. B. Young, executive secretary.

Intermountain Veterinary Medical Association. Annual convention. Hotel Utah, Salt Lake City, Jan. 22-24, 1958. Douglas R. McKelvie, correspondent.

Oklahoma Veterinary Medical Association. Annual meeting. Mayo Hotel, Tulsa, Jan. 25-27, 1959. M. N. Riemenschneider, 122 State Capitol Bldg., Oklahoma City, secretary.

Minnesota State Veterinary Medical Society. Annual meeting. Leamington Hotel, Minneapolis, Jan. 26-28, 1959. B.S. Pomeroy, University of Minnesota, College of Veterinary Medicine, St. Paul 1, Minn. secretary-treasurer.

Maryland State Veterinary Medical Association. Winter meeting. Emerson Hotel, Baltimore, Md., Jan. 27-28, 1959. Harry L. Schultz, Jr., secretary-treasurer.

Ohio State Veterinary Medical Association. Annual convention. Neil House Hotel, Columbus, Feb. 4-6, 1959. Harry C. Sharp, 1411 W. Third Ave., Columbus, Ohio, executive secretary.

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	100 Vials	57.00
	1000 Vials	550.00
Tetracycline Capsules 250mg	100	22.49
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	5000	53.00
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	1000	22.00
	5000	104.00
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Foreign Meetings

International Veterinary Congress. Sixteenth session. Madrid, Spain, May 21-27, 1959. Prof. Pedro Carda A., general secretary, Calle Villanueva 11, Madrid.

U.S. COMMITTEE: Dr. W. A. Hagan, chairman, New York State Veterinary College, Ithaca, N. Y.; Dr. J. G. Hardenbergh, secretary, 600 S. Michigan Ave., Chicago 5, Ill.

Third World Congress on Fertility and Sterility Amsterdam, Holland, June 7-13, 1959. Dr. L. I. Swaab, Sint Agnietenstraat 4, Amsterdam, Holland, honorary secretary.

Regularly Scheduled Meetings

ALABAMA—Central Alabama Veterinary Association, the first Thursday of each month. Dr. G. W. Jones, Main St., Prattville, Ala., secretary-treasurer.

Jefferson County Veterinary Medical Association, the second Thursday of each month. S. A. Price, 213 N. 15th St., Birmingham, secretary.

Mobile-Baldwin Veterinary Medical Association, the third Tuesday of each month. W. David Gross, 771 Holcombe Ave., Mobile, Ala., secretary.

North Alabama Veterinary Medical Association, the second Thursday of November, January, March, May, July, and September, in Decatur, Ala. Ray A. Ashwander, Decatur, Ala., secretary.

North East Alabama Veterinary Medical Association, the second Tuesday of every other month. Leonard J. Hill, P.O. Box 761, Gadsden, Ala., secretary-treasurer.

ARIZONA—Central Arizona Veterinary Medical Association, the second Tuesday of each month. Keith T. Maddy, Phoenix, Ariz., secretary.

Southern Arizona Veterinary Medical Association, the third Wednesday of each month at 7:30 p.m. E. T. Anderson, Rt. 2 Box 697, Tucson, Ariz., secretary.

CALIFORNIA—Alameda-Contra Costa Veterinary Medical Association, the fourth Wednesday of Jan., March, May, June, Aug., Oct., and Nov. Leo Goldston, 3793 Broadway, Oakland 11, Calif., secretary.

Bay Counties Veterinary Medical Association, the second Tuesday of February, April, July, September, and December. Herb Warren, 3004 16 St., San Francisco, Calif., executive secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. R. B. Barsaleau, 2333 E. Mineral King, Visalia, Calif., secretary.

Kern County Veterinary Medical Association, the first Thursday evening of each month. James L. Frederickson, 17 Niles St., Bakersfield, Calif., secretary-treasurer.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. W. H. Rockey, P. O. Box 121, San Luis Obispo, Calif., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 90 Corral de Tierra, Salinas, Calif., secretary.

North San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month at the Hotel Covell, in Modesto, Calif. Lyle A. Baker, Turlock, Calif., secretary.

Orange Belt Veterinary Medical Association, the second Monday of each month. Chester A. Maeda, 766 E. Highland Ave., San Bernardino, Calif., secretary.

Orange County Veterinary Medical Association, the third Thursday of each month. Donald E. Lind, 2643-N. Main St., Santa Ana, Calif., secretary.

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Peninsula Veterinary Medical Association, the third Monday of each month. R. M. Granfield, 2600 W. El Camino Real, San Mateo, Calif., secretary-treasurer.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. Robert L. Chandler, P.O. Box 8, Ukiah, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. W. E. Steinmetz, 4227 Freeport Blvd., Sacramento, Calif., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. H. R. Rossoll, 1795 Moore St., San Diego, Calif., secretary.

San Fernando Valley Chapter SCVMA, the second Tuesday of each month at 7:30 p.m., Hody's Restaurant, North Hollywood, Calif. Dr. V. H. Austin, 14931 Oxnard St., Van Nuys, secretary-treasurer.

San Fernando Valley Veterinary Medical Association, the second Friday of each month at the Casa Escobar Restaurant in Studio City. Dr. Rolf Reese, 23815 Ventura Blvd., Calabasas, Calif., secretary.

Santa Clara Valley Veterinary Association, the fourth Tuesday of each month. Kay Beulley, N. Fourth and Gish Rd., San Jose, Calif., secretary.

Southern California Veterinary Medical Association, the last Wednesday of each month. Don Mahan, 1919 Wilshire Blvd., Los Angeles 57, Calif., executive secretary.

Tulare County Veterinary Medical Association, the second Thursday of each month. D. E. Britten, 544 N. Ben Maddox, Visalia, Calif., secretary.

COLORADO—Denver Area Veterinary Society, the fourth

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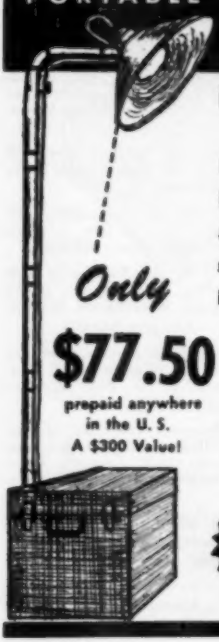

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Northern Colorado Veterinary Medical Society, the first Monday of each month. M. A. Hammarlund, School of Veterinary Medicine, Colorado A. & M. College, Fort Collins, Colo., secretary.

DELAWARE—New Castle County Veterinary Association, the first Tuesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. A. P. Mayer, Jr., R.F.D. 2, Newark, Del., secretary-treasurer.

FLORIDA—Central Florida Veterinary Medical Association, the first Tuesday of each month, time and place specified monthly. Jack H. McElyer, 5925 Edgewater Drive, Orlando, Fla., secretary.

Florida West Coast Veterinary Medical Association, the second Wednesday of each month at the Lighthouse Inn, St. Petersburg. William F. Casler, 2540 30th Ave., N., St. Petersburg, secretary-treasurer.

Jacksonville Veterinary Medical Association, the first Thursday of every month. Dodsons Restaurant, P. S. Roy, 4443 Atlantic Blvd., Jacksonville, Fla., secretary.

Northwest Florida Veterinary Medical Society, third Wednesday of each month, time and place specified monthly. T. R. Geci, 108B Catherine Ave., Pensacola, Fla., secretary.

Palm Beach Veterinary Society, the last Thursday of each month in the county office building at 810 Datura St., West Palm Beach. J. J. McCarthy, 500-25th Street, West Palm Beach, Fla., secretary.

Ridge Veterinary Medical Association, the fourth Thursday of each month in Bartow, Fla. Paul J. Myers, Winter Haven, Fla., secretary.

South Florida Veterinary Society, the third Wednesday of each month. Time and place specified monthly. Joe B. O'Quinn, 1690 E. 4th, Hialeah, Fla., secretary.

Suwannee Valley Veterinary Association, the fourth Tuesday of each month, Hotel Thomas, Gainesville. W. B. Martin, Jr., 3002 N. W. 6th St., Gainesville, Fla., secretary.

Volusia County Veterinary Medical Association, the fourth Thursday of each month. A. E. Hixon, 131 Mary St., Daytona Beach, Fla., secretary.

GEORGIA—Atlanta Veterinary Society, the third Thursday of each month at the Elk's Home, 726 Peachtree St., Atlanta. Donald C. Ford, Forest Park, secretary.

ILLINOIS—Chicago Veterinary Medical Association, the second Tuesday of each month. Charles H. Armstrong. 1021 Davis St., Evanston, secretary.

Eastern Illinois Veterinary Medical Association, the first Thursday of March, June, September, and December. A one-day clinic is held in May. Alfred G. Schiller, Veterinary Clinic, University of Illinois, Urbana, secretary-treasurer.

INDIANA—Central Indiana Veterinary Medical Association, the second Wednesday of each month. Peter Johnson, Jr., 4410 N. Keystone Ave., Indianapolis 5, secretary.

Michiana Veterinary Medical Association, the second Thursday of every month except July and December, at the Hotel LaSalle, South Bend, Ind. J. M. Carter, 3421 S. Main St., Elkhart, Ind., secretary.

Tenth District Veterinary Medical Association, the third Thursday of each month. J. S. Baker, P.O. Box 52, Pendleton, Ind., secretary.

IOWA—Cedar Valley Veterinary Medical Association, the second Monday of each month, except January, July, August, and October in Black's Tea Room, Waterloo, Iowa. A. J. Cotten, Grundy Center, secretary.

Central Iowa Veterinary Medical Association, the third Monday of each month, except June, July, and August, at 6:30 p.m., Breeze House, Ankeny, Iowa. John Herrick, Ames, secretary.

Coon Valley Veterinary Medical Association, the second Wednesday of each month, September through May, at 7:30 p.m., Cobblestone Inn, Storm Lake, Iowa. Robert McCutcheon, Holstein, secretary.

East Central Iowa Association, the second Thursday of each month at 6:30 p.m., usually in Cedar Rapids, Iowa. Dr. J. G. Irwin, Iowa City, secretary.

Fayette County Veterinary Medical Association, the third Thursday of each month at 6:30 p.m. in West Union, Iowa. H. J. Morgan, West Union, secretary.

Lakes Veterinary Association, the first Tuesday of each month, September through May, at 6:30 p.m., at the Gardson Hotel, Estherville, Iowa. Barry Barnes, Milford, secretary.

North Central Iowa Veterinary Medical Association, the third Thursday of April, at the Warden Hotel, Fort Dodge, Iowa. H. Engelbrecht, P. O. Box 797, Fort Dodge, secretary.

Northeast Iowa-Southern Minnesota Veterinary Association, the first Tuesday of February, May, August, and November at the Wisneslick Hotel, Decorah, Iowa, 6:30 p.m. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Northwest Iowa Veterinary Medical Association, the second Tuesday of February, May, September, and December, at the Community Bldg., Sheldon. W. Ver Meer, Hull, secretary.

Southeastern Iowa Veterinary Association, the first Tues-

(*Continued on adv. p. 42*)

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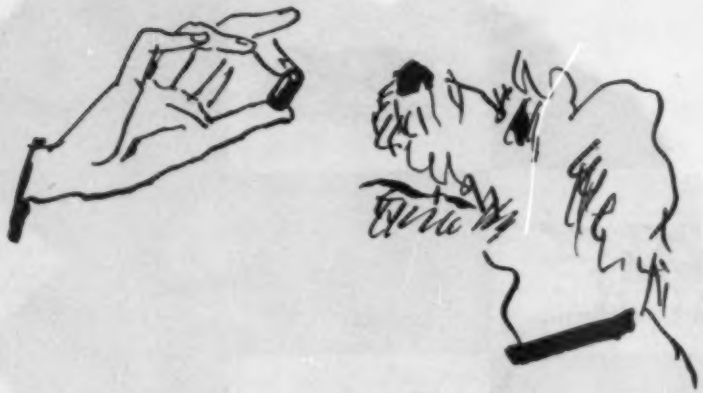

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1. Belloff, G. B.: Calif. Vet. 9:27 (Sept.-Oct.) 1956. 2. Mosier, J. E.: Vet. Med. 52:445 (Sept.) 1957.

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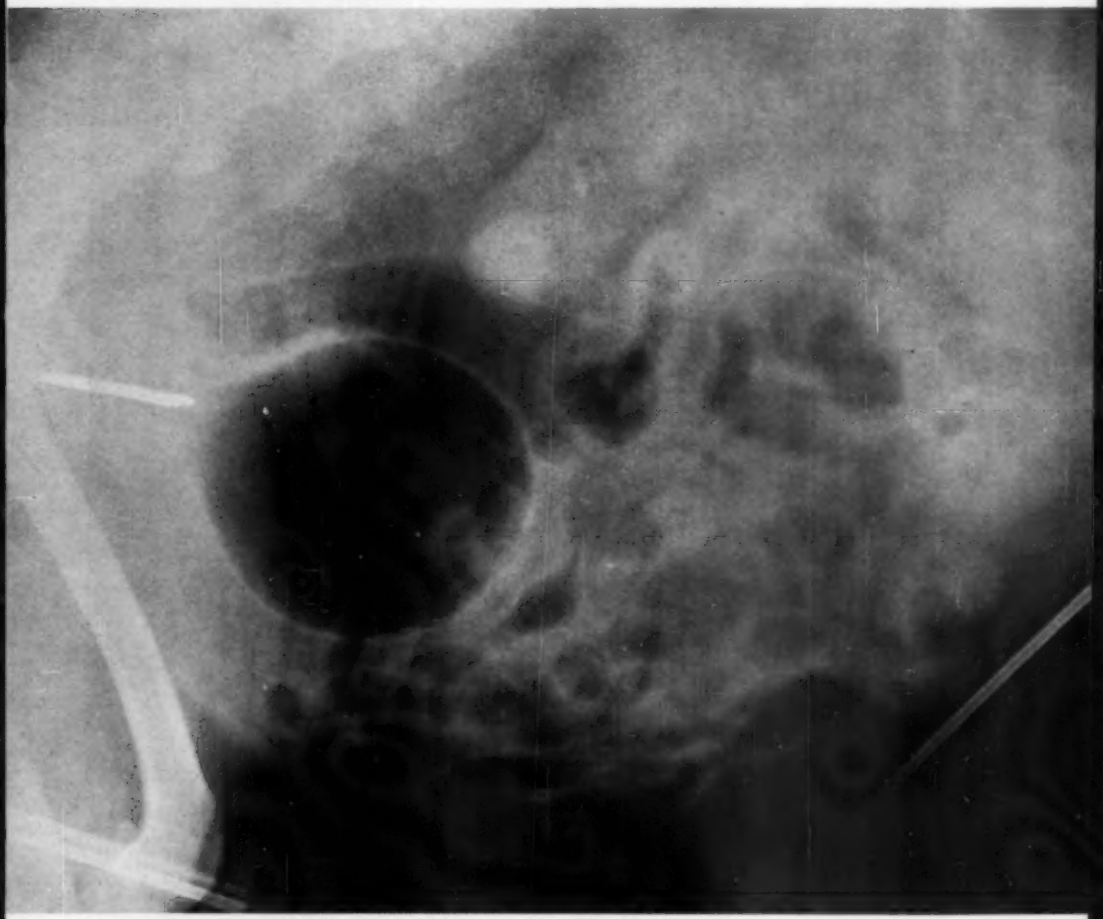

Fig. 1—Lateral radiopneumocystograph of the Cocker Spaniel.

History.—A male Cocker Spaniel, 6 years old, had hematuria and an occasional urinary incontinence for four months despite treatment. Finally, straining at micturation was observed; otherwise, the dog's health was good. A catheter was passed without resistance through the urethra and into the bladder. A lateral radiopneumocystograph was taken (fig. 1).

Here Is the Diagnosis

(Continued from preceding page)

Diagnosis.—A pedunculated growth at the fundus of the urinary bladder. This was confirmed by surgery.

Discussion.—Microscopically the mass was benign, probably associated with chronic cystitis. Such proliferation of the epithelium starts as a polypoid forma-

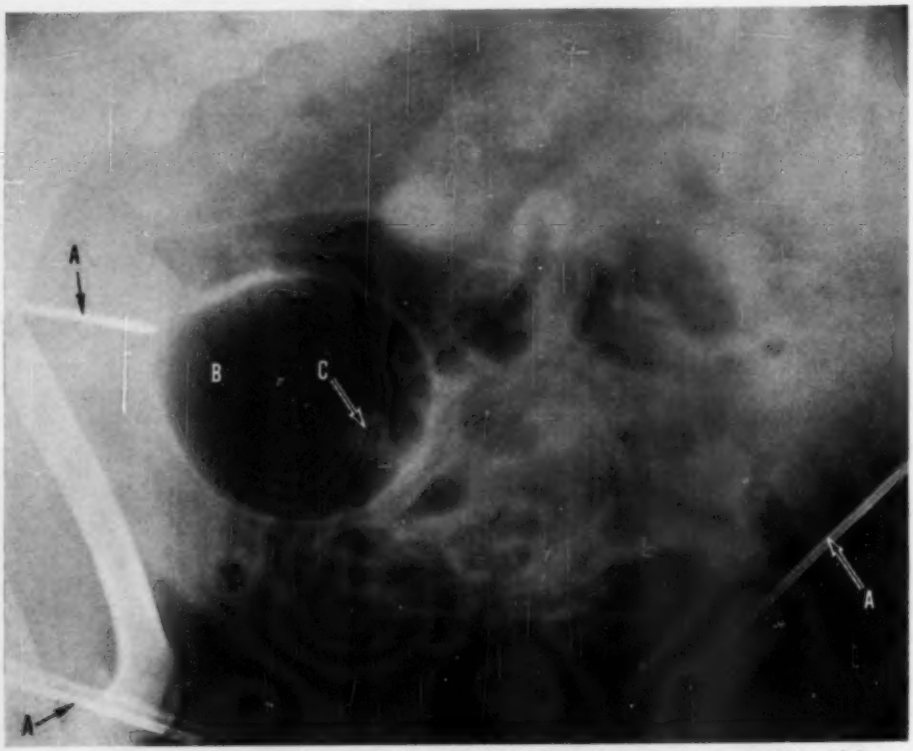

Fig. 2—Lateral radiopneumocystograph of the Cocker Spainel showing radiopaque catheter (a): inflated urinary bladder (b); and pedunculated tumor (c).

tion and later forms a true polyp which projects from the mucosa. Hematuria associated with ailments of the urinary bladder are common in the dog. Bleeding may be the result of trauma, inflammation, uroliths, tumor, or a generalized blood dyscrasia.

This case report was submitted by Dr. I. Zimmerman, practitioner, New York, N.Y.

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Southwestern Iowa Veterinary Medical Association, the first Tuesday of April and October, Hotel Chieftain, Council Bluffs, Iowa. J. P. Stream, Creston, secretary.

Upper Iowa Veterinary Medical Association, the third Tuesday of each month at 7:00 p.m., at All Vets Center, Clear Lake, Iowa. Richard Baum, Osage, secretary.

KENTUCKY—Central Kentucky Veterinary Medical Association, the first Wednesday of each month. R. H. Folsom, P.O. Box 323, Danville, Ky., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday of each month in Louisville or within a radius of 50 miles, except January, May, and July. G. R. Comfort, 2102 Reynolds Lane, Louisville, Ky., secretary-treasurer.

MARYLAND—Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m., at the Park Plaza Hotel, Charles and Madison St., Baltimore, Md. Norman Herbert, 3506 Joann Drive, Baltimore 7, Md., secretary.

MICHIGAN—Central Michigan Veterinary Medical Association, the first Wednesday of every month at 7 p.m. Frank A. Carter, P.O. Box 78, Carson City, Mich., secretary.

Mid-State Veterinary Medical Association, the fourth Thursday of each month with the exception of November and December. Robert E. Kader, 5034 Armstrong Rd., Lansing 17, Mich., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. S. Correll, Rt. 1, Midland, Mich., secretary.

Southeastern Veterinary Medical Association, the fourth Wednesday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Rd., Detroit 5, Mich., secretary.

MISSOURI—Greater St. Louis Veterinary Medical Association, the first Friday of each month (except July and August), at the Coronado Hotel, Lindell Blvd. and Spring Ave., St. Louis, Mo., at 8 p.m. Edwin E. Epstein, 4877 Natural Bridge Ave., St. Louis 15, Mo., secretary.

Kansas City Veterinary Medical Association and Kansas City Small Animal Hospital Association, the third Thursday of each month at the Hotel President, Kansas City, Mo. Frank A. O'Donnell, Parksville, Mo., secretary-treasurer.

NEVADA—Western Nevada Veterinary Society, the first Tuesday of each month. Paul S. Silva, 1170 Airport Road, Reno, Nev., secretary.

NEW JERSEY—Central New Jersey Veterinary Medical Association, the second Thursday of November, January, March, and May at Old Hights Inn, Hightstown, N. J. David C. Tudor, Cranbury, N. J., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from October through April, except December, at the Irvington House, 925 Springfield Ave., Irvington, N.J. Bernard M. Weiner, 787 Clinton Ave., Newark, N.J., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday of each month at the Elks Club, Hackensack. Burritt Lupton, 569 Franklin Ave., Wyckoff, secretary.

Northwest Jersey Veterinary Society, the third Wednesday of every odd month. G. L. Smith, P.O. Box 938, Trenton, N.J., secretary.

Southern New Jersey Veterinary Medical Association, the fourth Tuesday of each month at the Collingswood Veterinary Hospital, Collingswood. R. M. Sauer, secretary.

NEW MEXICO—Bernalillo County Veterinary Practitioners Association, third Wednesday of each month, Fez Club, Albuquerque, N.M. Jack Ambrose, 3018 N. Rio Grande Blvd., Albuquerque, secretary-treasurer.

NEW YORK—New York City, Inc., Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63rd St., New York City. C. E. DeCamp, 43 West 61st St., New York 23, N. Y., secretary.

New York State Veterinary College, Annual conference for veterinarians. Cornell University, Ithaca. W. A. Hagan, New York State Veterinary College, Cornell University, Ithaca, N. Y., dean.

Monroe County Veterinary Medical Association, the first Thursday of even-numbered months except August. Irwin Bircher, 50 University Ave., Rochester, N. Y., secretary.

NORTH CAROLINA—Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel, Greensboro. W. R. Dobbs, Box 869, Albemarle, secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly, Byron H. Brow, Box 453, Goldsboro, N. Car., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month. T. L. James, Box 243, Newton, N. Car., secretary.

(Continued on adv. p. 47)

AVMA Research Fellowships Available

The Research Council of the AVMA announces the availability of a number of fellowships for postgraduate training for the academic year, 1959-1960.

The recipient of a fellowship must be a veterinarian and a citizen of the United States or Canada. Veterinary students who expect to graduate at the end of the current school year and who wish to follow a career in research may apply for a fellowship.

The latest date for filing the completed application is Feb. 15, 1959. Approximately one month is required for processing completed applications after receipt by the secretary of the Council. Qualified persons should secure and submit applications as early as possible to insure their file being complete for presentation to the Committee on Fellowships.

The Committee on Fellowships of the Research Council will meet in March to consider applications, and the awards will be announced soon afterward. The stipend will be determined in each case by the needs of the individual, the location of the school in which he proposes to work, and other factors. In general, the stipends range from $100 monthly and upward.

Any qualified person interested in graduate training may obtain application blanks and other information by writing to Secretary, AVMA Research Council, C. H. Cunningham, College of Veterinary Medicine, Michigan State University, East Lansing, Mich.

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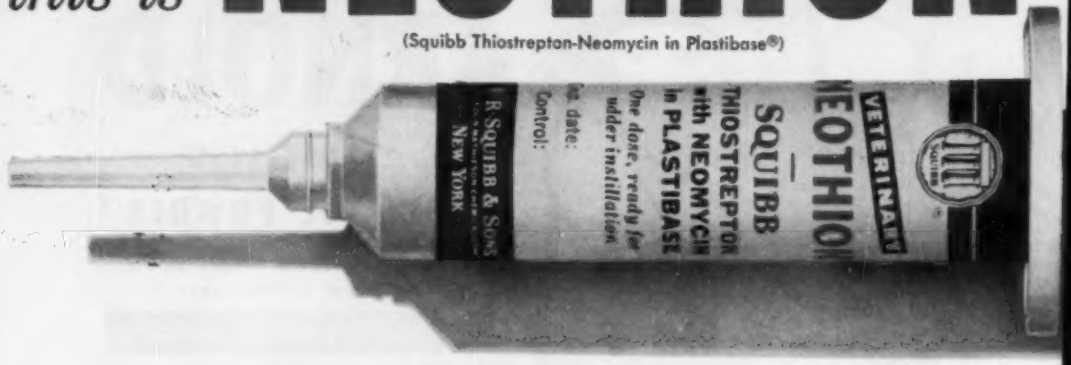

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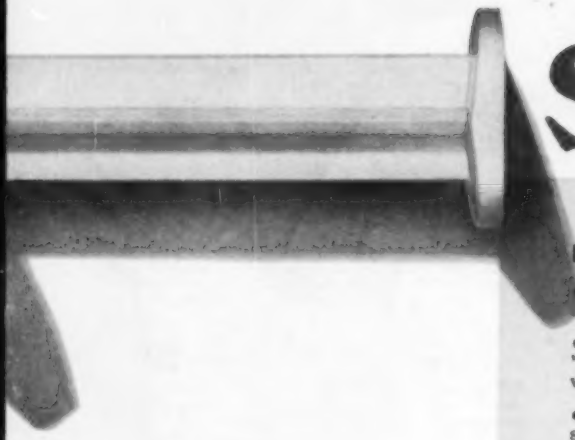

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Penicillin	▨	▨	▨	▨					
Streptomycin			▨	▨	▨	▨	▨	▨	
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Twin Carolinas Veterinary Medical Association, the third Friday of each month at Orange Bowl Restaurant, Rockingham, N. Car., at 7:30 p.m. J. E. Currie, 690 N. Leak St., Southern Pines, N. Car., secretary.

Western North Carolina Veterinary Medical Association, the second Thursday of every month at 7:00 p.m. in the George Vanderbilt Hotel, Asheville, N. Car. Vilu Lind, 346 State St., Marion, N. Car., secretary.

OHIO—Cincinnati Veterinary Medical Association, the third Tuesday of every month at Shuller's Wigwam, 6210 Hamilton Ave., at North Bend Road, G. C. Lewis, Cincinnati, Ohio, secretary-treasurer,

Columbus Academy of Veterinary Medicine, every month, September through May. E. M. Simonson, Columbus, Ohio, secretary-treasurer.

Cuyahoga County Veterinary Medical Association, the first Wednesday in September, October, December, February, March, April and May, at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. F. A. Coy, Cleveland, Ohio, secretary.

Dayton Veterinary Medical Association, the third Tuesday of every month. O. W. Fallang, Dayton, secretary.

Killbuck Valley Veterinary Medical Association, the first Wednesday of alternate months beginning with February. D. J. Kern, Killbuck, Ohio, secretary-treasurer.

Mahoning County Veterinary Medical Association, the third Tuesday of each month, at 9:00 p.m., Youngstown Maennerchor Club, Youngstown, Ohio. Sam Segall, 2935 Glenwood Ave., Youngstown, secretary.

Miami Valley Veterinary Medical Association, the first Wednesday of December, March, June, and September. J. M. Westfall, Greenville, Ohio, secretary-treasurer.

North Central Ohio Veterinary Medical Association, the last Wednesday of each month except during the summer. R. W. McClung, Tiffin, Ohio, secretary-treasurer.

Northwestern Ohio Veterinary Medical Association, the last Wednesday of March and July. C. S. Alvanos, Toledo, Ohio, secretary-treasurer.

Stark County Veterinary Medical Association, the second Tuesday of every month, at McBrides Emerald Lounge, Canton, Ohio. M. L. Willen, 4423 Tuscarawas St., Canton, Ohio, secretary.

Summit County Veterinary Medical Association, the last Tuesday of every month (except June, July, and August), at the Mayflower Hotel, Akron, Ohio. M. L. Scott, Akron, Ohio, secretary-treasurer.

Tri-County Veterinary Medical Association, the fourth Wednesday of January, May, and September. Mrs. R. Slusher, Mason, Ohio, secretary-treasurer.

OKLAHOMA—Oklahoma County Veterinary Medical Association, the second Wednesday of every month, 7:30 p.m., Patrick's Foods Cafe, 1016 N.W. 23rd St., Oklahoma City. Forest H. Stockton, 2716 S.W. 29th St., Oklahoma City, Okla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month in Directors' Parlor of the Brookside State Bank, Tulsa, Okla. Don L. Hohmann, 538 S. Madison St., Tulsa, Okla, secretary.

OREGON—Portland Veterinary Medical Association, the second Tuesday of each month, at 7:30 p.m., Ireland's Restaurant, Lloyds', 718 N.E. 12th Ave., Portland. Donald L. Moyer, 8415 S.E. McLoughlin Blvd., Portland 2, Ore., secretary.

Willamette Veterinary Medical Association, the third Tuesday of each month, except July and August, at the Marion Hotel, Salem. Marvin M. Corff, McMinnville, Ore., secretary.

PENNSYLVANIA—Keystone Veterinary Medical Association, the fourth Wednesday of each month at the University of Pennsylvania School of Veterinary Medicine. Raymond C. Snyder, N.E. Corner 47th St. and Hazel Ave., Philadelphia 43, Pa., secretary.

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Lehigh Valley Veterinary Medical Association, the first Thursday of each month. Stewart Rockwell, 10th and Chestnut Sts., Emmaus, Pa., secretary.

Pennsylvania Northern Tier Veterinary Medical Association, the third Wednesday of each odd numbered month. R. L. Michel, Troy, Pa., secretary.

SOUTH CAROLINA—Piedmont Veterinary Medical Association, the third Wednesday of each month at the Fairforest Hotel, Union, S. Car. Worth Lanier, York, S. Car., secretary.

TEXAS—Coastal Bend Veterinary Association, the second Wednesday of each month. J. Marvin Prewitt, 4141 Lexington Blvd., Corpus Christi, Texas, secretary.

VIRGINIA—Central Virginia Veterinarians' Association, the third Thursday of each month at the William Byrd Hotel in Richmond at 8:00 p.m. M. R. Levy, 312 W. Cary Ct., Richmond 20, Va., secretary.

Northern Virginia Veterinary Conference, the second Tuesday of each month. Francis E. Mullen, 1130 S. Main St., Harrisonburg, Va., secretary-treasurer.

Northern Virginia Veterinary Society, the second Wednesday of every third month. Meeting place announced by letter. H. C. Newman, Box 145, Merrifield, secretary.

Southwest Virginia Veterinary Medical Association, the first Thursday of each month. I. D. Wilson, Blacksburg, secretary.

WASHINGTON—Seattle Veterinary Medical Association, the third Monday of each month, Magnolia American Legion Hall, 2870 32nd W., Seattle. Roy C. Toole, 10415 Main St., Bellevue, secretary.

South Puget Sound Veterinary Association, the second Thursday of each month except July and August. B. D. Benedictson, 3712 Plummer St., Olympia, Wash., secretary.

WEST VIRGINIA—Kyowva (Ky., Ohio, W. Va.) Veterinary Medical Association, the third Thursday of each month in the Hotel Pritchard, Huntington, W. Va., at 8:30 p.m. Harry J. Fallon, 200 5th St., W. Huntington, W. Va., secretary.

WISCONSIN—Central Wisconsin Veterinary Medical Association, the second Tuesday of each quarter (March, June, Sept., Dec.). D. F. Ludvigson, Ridgeland, Wis., secretary.

Dane County Veterinary Medical Association, the second Thursday of each month. Dr. E. P. Pope, 409 Farley Ave., Madison, Wis., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. Dr. R. H. Steinkraus, 7701 N. 59th St., Milwaukee, Wis., secretary.

Northeastern Wisconsin Veterinary Medical Association, the third Wednesday in April. William Madson, 218 E. Washington St., Appleton, Wis., secretary.

Rock Valley Veterinary Medical Association, the first Wednesday of each month. W. E. Lyle, P. O. Box 107, Deerfield, Wis., secretary.

Southeastern Veterinary Medical Association, the third Thursday of each month. John R. Curtis, 419 Cook St., Portage, Wis., secretary.

Wisconsin Valley Veterinary Medical Association, the second Tuesday of every other month. E. S. Scobell, Rt. 2, Wausau, Wis., secretary.

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References: 1. Kakavas, J. C.; Roberts, H. D. B.; de Courcy, S. J. and Ewing, D. L.: J. Am. Vet. M. Ass. 119:203 (Sept.) 1951. 2. Kakavas, J. C.: Antibiotics Annual 1954-1955, New York, Medical Encyclopedia, Inc., 1955, p. 323. 3. Mires, M. H. and Chadwick, R. H.: Vet. News 10:3 (Jan.-Feb.) 1947. 4. Mires, M. H.: J. Am. Vet. M. Ass. 117:49 (July) 1950. 5. Mires, M. H.: Vet. News 14:9 (May-June) 1951. 6. Roberts, H. D. B.; Kakavas, J. C. and Biddle, E. S.: N. Amer. Vet. 34:247 (April) 1953.

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Ambitious 1956 Colorado graduate, with service obligation completed November 1, desires location in western or intermountain area. Prefer small animal practice. Address "Box S 3," c/o JOURNAL of the AVMA.

Veterinarian desires association in equine practice. Kansas State graduate. Experience: mixed practice with racetrack work summer and fall. Address "Box S 8," c/o JOURNAL of the AVMA.

Graduate, 1958, Florida license, desires position with established practitioner in Florida. Age 28, married, veteran. Address "Box S 9," c/o JOURNAL of the AVMA.

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Want to buy Florida small animal hospital; have license. Will pay appraised real estate value plus ½ of average 3-year gross. Address "Box S 7," c/o JOURNAL of the AVMA.

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Too Late to Classify

Foreign graduate desires a long-term position with a small animal practitioner in Illinois. Would also consider position in mixed practice. Address "Box S 14," c/o JOURNAL of the AVMA.

The telltale signs by which a poultry predator might be identified were suggested by a writer in *Wallaces' Farmer* (Sept. 7 (1957): 30). They are: Opossums leave a partially eaten carcass, or only a few feathers and bones; foxes may leave a trail of feathers to the pullet carcass near a fence; owls leave a headless carcass; raccoons may carry off the carcass or leave a pile of bones; dogs usually break the ribs or back between the wings.

[We recall an owner presenting a 2-bushel box full of chickens, about 3 lb. each, which were found dead one morning around a portable chicken house set in a field. He suspected poisoning. On necropsy, there was massive internal hemorrhage in each bird and, when the carcasses were skinned, each showed a uniform pattern of teeth marks across the middle of the back. Marauding dogs were suspected but when the alerted owner heard a disturbance at dawn the next morning, he shot the culprit—a fox.—W.A.A.]

A Pocket Radio as a Telephone Signal.—A small pocket radio with a whistle signal is part of a "page-you-anywhere" telephone system being tested for the use of persons who must maintain contact with their offices. When the operator dials, the signal tones are transmitted on a 35-megacycle channel to the radio. The receiver then goes to the nearest telephone and calls his office.—*Sci. News Letter (July 5, 1958): 5.*

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Exclusive Publication.—Articles submitted for publication are accepted with the understanding that they are not submitted to other journals, which is ethical publication procedure.

Manuscripts.—Manuscripts, including **footnotes, references,** and **tables,** must be typewritten, **double-spaced,** on 8½- by 11-in. bond paper, and the original and one carbon copy, submitted. One-inch margins should be allowed on the sides, with 2 in. at top and bottom. Articles should be concise. Short, simple sentences are clearer and more forceful than long, complex ones.

Illustrations.—Photographs should be furnished in glossy prints, and of a size that will fit into the JOURNAL of the American Veterinary Medical Association with a minimum of reduction. Photomicrographs which can not be reduced should be marked for cropping to 1-column or 2-column width. Identifying marks within the photomicrographs, such as arrows, letters, or numbers, should be clearly marked with black India ink or white opaque ink to insure good contrast for reproduction and must be large enough to stand reduction, if necessary.

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References.—References should be typed **double space,** in alphabetical order, and should be prepared in the following style: name of author, title of article, name of periodical with volume, year, and page numbers. References to journals not commonly known should give the complete name of the periodical, and where published so that they may be added to our reference files. When books are cited, the name of publisher, location, edition, and year should be given.

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Index to Advertisers in This Issue

Abbott Laboratories	30
Affiliated Laboratories Corp.	13
American Optical Co.	8
Armour Veterinary Laboratories	6
Arnold Laboratories	43
Atlas Canine Products, Inc.	21
Brinkman Mfg. Co.	48
Carter-Luff Chemical Co.	51
Ciba Pharmaceutical Products, Inc.	37
Colwell Publishing Co.	31
Corn Belt Laboratories, Inc.	4
Corn States Laboratories, Inc.	2nd cover
Diamond Laboratories	22
Eaton Laboratories	27, 38, 50
Emergency Kit Corp.	7
Fort Dodge Laboratories	24
Fromm Laboratories	19
Fungus Diagnostic Services	35
Haver-Lockhart Laboratories	18
Hoffman Co., The Victor	35
Jensen-Salsbery Laboratories, Inc.	4th cover
Ken-L Products	10
Massengill Company, S. E.	11, 49
Merck & Co., Inc.	14
National Band & Tag Co.	36
Nicholson Manufacturing, Inc.	23
Norden Laboratories	1
Parke, Davis & Company	25
Pitman-Moore Company	3, 3rd cover
Professional Printing Company	15
Schering Corp.	5
Silent Glow Oil Burner Corp.	16
Squibb	44, 45, 46
United States Savings Bonds	20
Veterinary Medicine Supply	32
Vitamineral Products Co.	17
Warner-Chilcott Laboratories	9
Wilmot-Castle Co.	47
Winthrop Laboratories, Inc.	41
Woodlets, Inc.	34
Wyeth	33

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